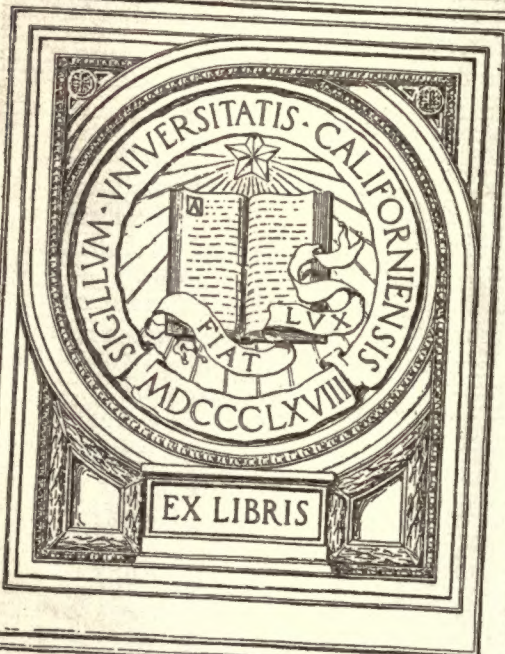


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Catalog C, we ask that you kindly tear off the
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Laboratory Apparatus

FOR
CHEMICAL, INDUSTRIAL, BACTERIOLOGICAL,
BIOLOGICAL, BOARD OF HEALTH AND
SOIL TESTING LABORATORIES

MADE IN AMERICA

CATALOG C

No. 218

Established
1889

A. H. McCONNELL, President
H. C. ARMS, Vice-President
J. M. ROBERTS, Secretary

Incorporated
1900

MANUFACTURED AND SOLD BY

CENTRAL SCIENTIFIC CO., *company, Chicago.*

460 East Ohio Street

(Lake Shore Drive, Ohio and Ontario Streets)

CHICAGO

U. S. A.

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OUR NEW LOCATION.

Our new location, on Chicago's famous Lake Shore Drive, extending from Ohio to Ontario Street, is a well-lighted, modern, up-to-date six story building admirably adapted to our needs. Its 146,000 square feet of floor space afford us ample room for our manufacturing facilities as well as for our large and complete stock of scientific equipment.

COME AND VISIT US WHEN IN THE CITY.



The Central Corridor of Our Spacious and Well Lighted Offices.



A Corner of Our Display Room.



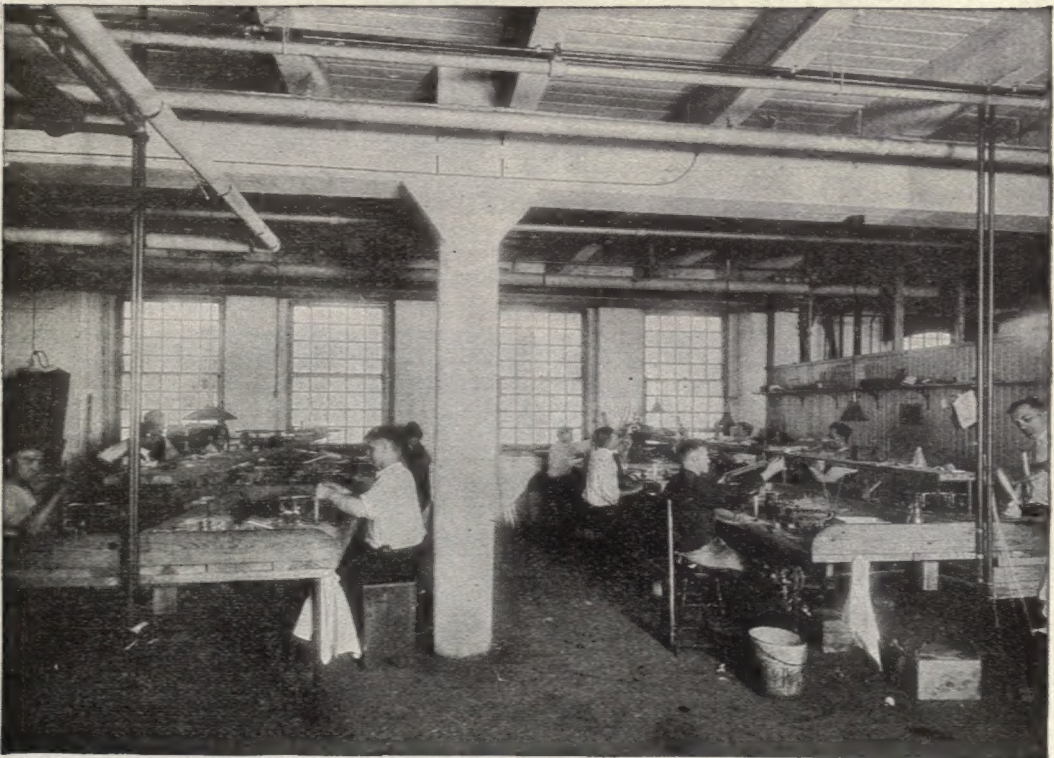
Looking Down the Central Aisle of Our Instrument Shop.



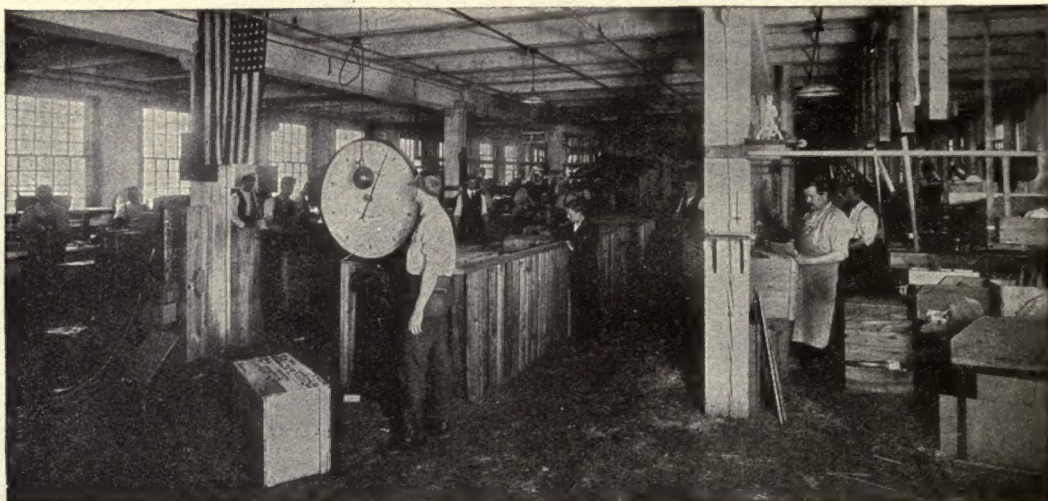
Our Heavy Duty Machinery Room.



Our Chemical Stock and Packing Room.



One Corner of Our Glass Shop, which Includes in Addition to the Lamp Room (shown here) a Graduating and Grinding Room, an Acid Room, an Annealing Furnace, a Stock and Preparation Room and a Business Office.



A View of Our Shipping Room.



One Section of Stock Bins Showing How Goods are Stored When Taken Out of the Original Cases. Over 40,000 Square Feet of Floor Space are Occupied by Our Stock of Scientific Apparatus.



One Section of Our Reserve Stock.

TO OUR CUSTOMERS

In bringing out this war edition of our Chemical, Industrial and Bacteriological Catalog we wish to call the attention of those into whose hands it comes to certain features which we believe are worthy of careful attention.

AMERICAN MADE APPARATUS.

We have eliminated from this catalog all apparatus which was formerly imported and has not been duplicated up to this time in this country. This is the first and only truly American catalog of chemical laboratory supplies published which pretends to be at all complete. The only important item of foreign manufacture listed is Whatman English Filter Paper, a line which has won the support of all chemists, and for which no American substitute has as yet been introduced.

UP-TO-DATE APPARATUS.

We have selected only up-to-date types of apparatus, leaving out any forms which appear from our experience to be classical relics.

PROMPT DELIVERIES.

We have included only apparatus which we know is being manufactured at this time, and can be delivered within a reasonable length of time. We can not, of course, predict the effect which the demands of the war may have upon the discontinuance of any manufactured articles, nor the effect of the demands of Government laboratories upon the adequacy of the supply. We are endeavoring to keep a large stock and every square foot of available space in the 2½ acres of our 6 story building is packed to the roof with reserve stock.

GLASSWARE AND PORCELAIN.

Our stocks of glassware and porcelain have been selected from the American market after 3½ years of careful observation, experiment and comparison of data from various sources. We believe them to be the best adapted to the needs of American laboratories. We propose to change brands only after we have been convinced that such a change best serves the needs of the chemical trade.

PRICES.

The prices in this catalog were current at the time of publication. Owing to the rapid changes in the cost of raw materials and of labor, we cannot guarantee prices to remain constant for any length of time. We shall be glad to fill orders at prices current at the time of their receipt. If necessary to have the exact cost of materials, we urge our customers to send in their lists for quotation.

ORDERS AND LISTS FOR QUOTATION.

1. When possible, specify our catalog number, name of article and dimensions. Further specification is not necessary. We furnish conveniently ruled order sheets upon request.

Note: Lists made from catalogs of other dealers will be transposed by us into our own numbers when possible, with our guarantee that the articles will equal in efficiency and finish those originally specified.

2. Specify date when shipment is desired, with route and method of shipment, i. e., parcel post, express or freight.

BOXING.

No Charge for Boxing and Cartage except on orders of \$10.00 or less; then a nominal charge will be made if the boxing exceeds five per cent of the value of the shipment. Prices are F. O. B. Chicago, unless otherwise specified.

TERMS.

Terms are net, thirty days after delivery. Orders from parties unknown to us should be accompanied by remittance or by satisfactory business references.

Note: Unless otherwise directed, invoices and statements will be mailed to the person placing the order, upon whom we rely to O. K. the Bills Promptly and thus Expedite Payment.

REMITTANCES.

Remittances should be in exchange at par in Chicago, as we are obliged to pay exchange upon all private checks, except from a few of the largest cities.

SHIPMENTS.

Unless otherwise ordered, shipments are made by us At Once, by such routes as will insure earliest delivery. Large shipments are made by freight and smaller shipments by express or parcel post, as seems expedient to us.

CLAIMS FOR BREAKAGE.

We employ only experienced packers and guarantee our goods to be in first class condition when delivered to the carrier. Our responsibility ceases at that point, and all claims for damage or breakage must be made upon the carrier responsible for their safe delivery. We shall be glad to aid in any way possible in the prosecution of such claims and the recovery of damages.

ORIGINAL CASES.

We especially recommend that our customers take advantage of quantity purchases. American manufacturers of glassware and porcelain have made it possible to secure these commodities in original case lots at wholesale prices.

RETURNED GOODS.

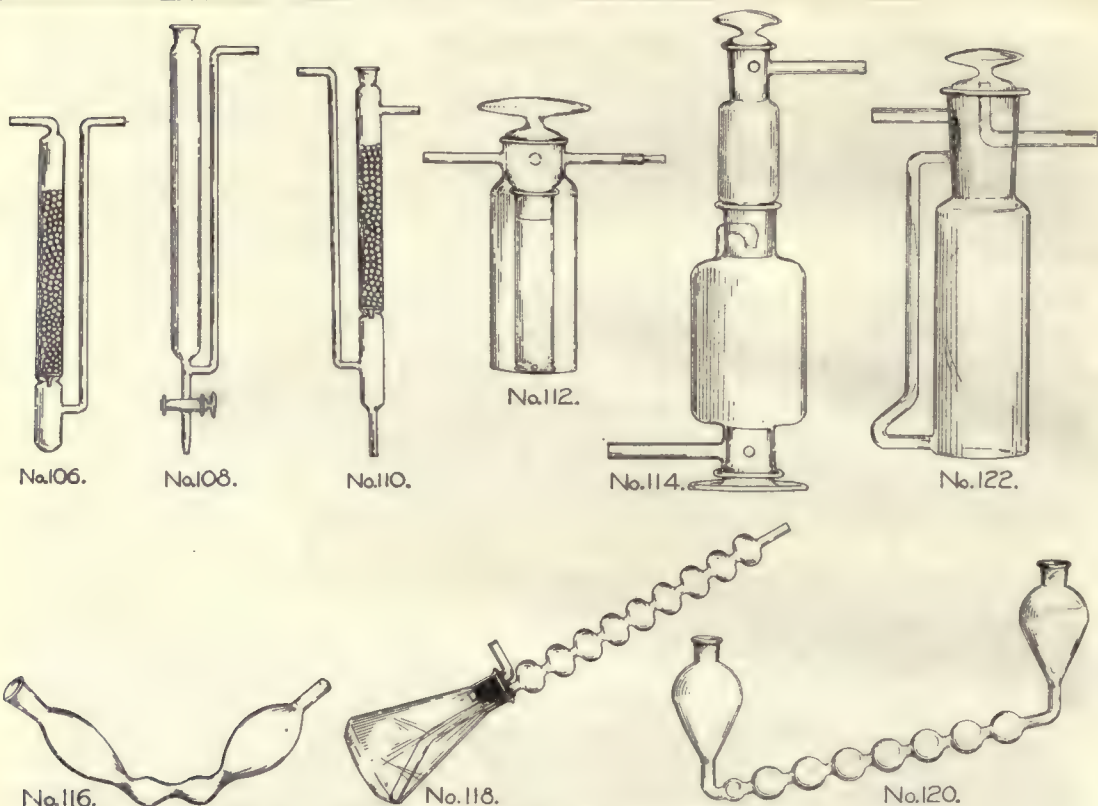
In order to avoid the delays incident to the identification of returned goods, we respectfully insist that no articles be sent in without first notifying us as to the reason for their return and the disposition to be made of them. Frequently adjustments can be made without the necessity of returning the goods. If after consideration it appears necessary that the goods be returned, we shall send suitable shipping tags which will insure prompt attention upon their receipt.

NOTICE TO THE TRADE.

Special notice is given to the trade that this catalog is copyrighted, and that unauthorized reproduction of new cuts or illustrations therefrom constitutes actionable infringement of our rights. We shall use every legal means to protect our work and property.

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CENTRAL SCIENTIFIC COMPANY.



- ABDERHALDEN REAGENTS**, see **Blood Testing Apparatus**.
102. **ABSORBENT COTTON**, best quality.
- | Size of package, ounces..... | 1 | 4 | 8 | 16 |
|------------------------------|--------|-----|-----|-----|
| Each | \$0.10 | .20 | .35 | .65 |
- ABSORPTION APPARATUS** for Chlorine, see No. 2828.
106. **ABSORPTION TUBE**, Babo's, filled with glass beads. Total length, 13 inches; diameter of body, 1 inch. Will take an 8 inch column of beads \$3.25
108. **ABSORPTION TUBE**, Camp's. Length of body, 13 inches; diameter, $1\frac{1}{16}$ inch..... 3.00
110. **ABSORPTION TUBE**, Emmerling's, filled with glass beads. Total length, $15\frac{1}{2}$ inches; diameter of body, 1 inch. Will take an 8 inch column of beads..... 3.90
112. **ABSORPTION TUBE**, Fisher's, for the absorption of carbon dioxide or water in elementary organic analysis in place of the usual U tubes. It has the following advantages: 30 cc capacity instead of 22 cc of the ordinary 11 cm U tubes; more easily and thoroughly cleaned; only one hollow stopper which shuts off both openings with one turn; will stand on the balance pan; and needs no hangers when joined in the absorption train. When filled, the bottle weighs about 65 grams. (See Journal of Industrial and Engineering Chemistry, Vol. VIII, No. 4, for April 1916, page 368)..... 5.00
114. **ABSORPTION TUBE**, Fleming's, for carbon determinations in iron and steel by the combustion method. Very rapid and exact, retaining every trace of carbon dioxide and moisture. One charge of soda lime will absorb 100 combustions, or one charge of phosphorus pentoxide 300 combustions on a 1.5 gram sample of 0.75 per cent. carbon steel..... 6.00
116. **ABSORPTION TUBE**, Hinman's, used extensively for the determination of ammonia in illuminating gas..... .75
118. **ABSORPTION TUBE**, as used by the Illinois Steel Company for absorptions in barium hydroxide, consisting of 9 bulbs with bent stem, for use with a 500 cc Erlenmeyer flask. Total length of tube, $20\frac{1}{2}$ inches. Without flask. (See Journal of Industrial and Engineering Chemistry, Vol. VI, No. 10, for October 1914, page 844)..... 1.25
120. **ABSORPTION TUBE**, Meyer's, for the absorption of carbon dioxide in barium hydroxide; as described in Standard Methods for Chemical Analysis of Plain Carbon Steel, adopted in 1914 by the American Society for Testing Materials. Consists of a series of 10 small bulbs holding from 10 to 15 cc each, with large bulbs at the ends having a capacity equal to that of the small bulbs combined..... 2.60
122. **ABSORPTION TUBE**, Nesbitt's, for the absorption of carbon dioxide in soda lime in the determination of carbon in iron and steel, designed by C. E. Nesbitt, chief chemist of the Carnegie Steel Company, Edgar Thomson Works. A slight turn of the stopper closes inlet and outlet tubes, sealing the bulb for weighing. The bulb filled weighs about 135 grams. Very rapid, enabling combustions to be run in 6 minutes. As many as 100 combustions may be run on a 0.50 per cent. carbon steel with 1.5 gram samples without refilling..... 3.50



No. 124.



No. 126.



No. 136.



No. 138.



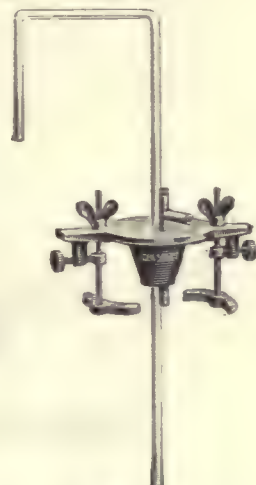
No. 123.



No. 128.



No. 132.



No. 134.

123. **ABSORPTION TUBE, Nesbitt's Improved**, same as No. 123, but with inlet tube extended inside bulb and bent downward to diffuse gas through entire bottle..... **\$4.00**
124. **ABSORPTION TUBE, Vanier's** (patented), for the absorption of carbon dioxide in potassium hydroxide in determining carbon in steel by the combustion method. Designed by George P. Vanier, Chief Chemist of the Pennsylvania Steel Company. Consists of a potash bulb and drying tube combined, capable of absorbing 100 combustions without refilling..... **10.50**
126. **ABSORPTION TUBE, Wesson's**, designed by L. G. Wesson, of the United States Bureau of Standards. The apparatus weighs 20 to 25 grams empty. Will hold 35 grams of soda lime and 7 grams of calcium chloride, and will absorb 10 grams carbon dioxide without renewal. A capillary tube between the bulbs is substituted for a stopcock, making the outfit very light. (See Journal of Industrial and Engineering Chemistry, Vol. VI, No. 6, for June 1914, page 461) **4.00**

For other **ABSORPTION TUBES AND BULBS**, see **Calcium Chloride Tubes; Potash Bulbs.**

ACID BASINS OR DISHES, see **Dishes.**

ACID JARS, see **Jars.**

ACID MEASURES FOR MILK, see **Milk Testing Apparatus.**

128. **ACID PITCHERS**, of stoneware, with handle.

Capacity, quarts.....	1	2	4
Each .....	.40	.50	1.25

130. **ACID PROOF FINISH** for chemical laboratory tables. While this preparation is not absolutely acid proof, it is a finish which has been successfully employed for years in many of the leading laboratories. Consists of two solutions with full directions for applying. The finished top will be black. **Per gallon (½ gallon of each solution) 2.50**

132. **ACID PUMP**, with force pump attached, for withdrawing acid from containers. Will fit any bottle or carboy having a neck from 1¾ to 2½ inches diameter..... **8.00**

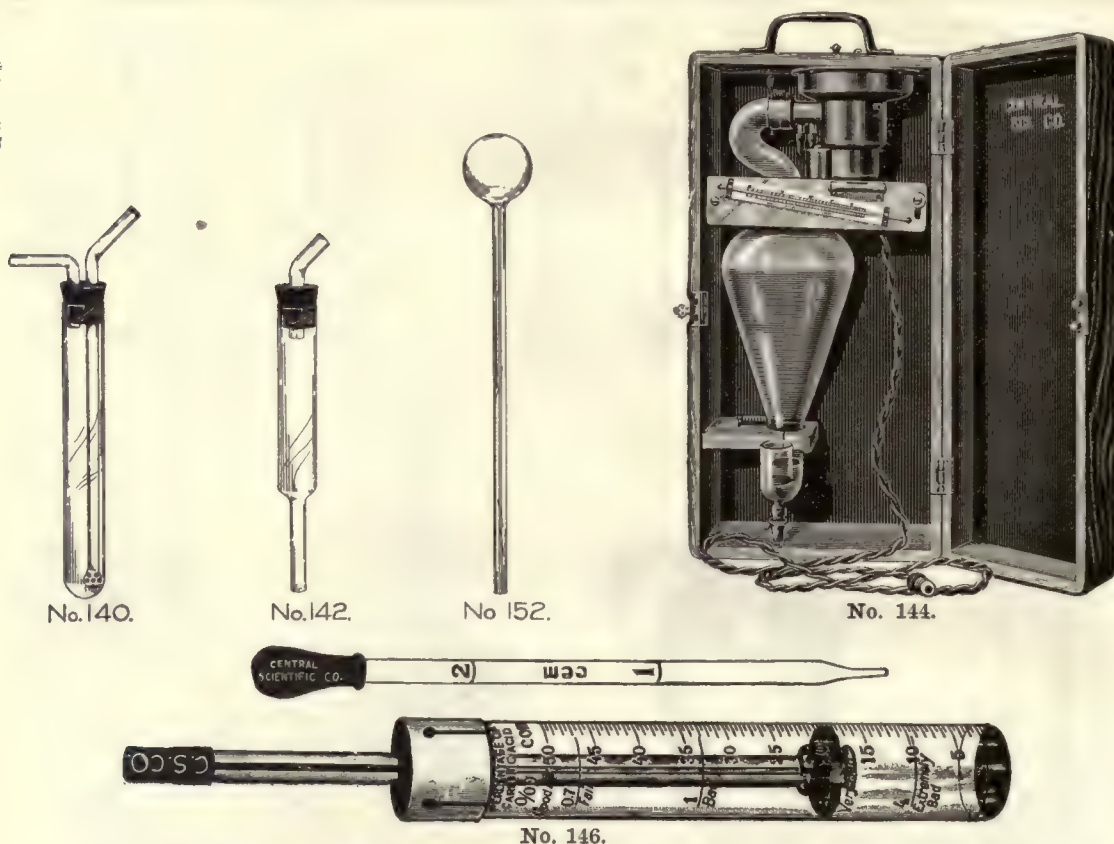
134. **ACID PUMP** for drawing acids and ammonia from carboys. Clamps hold it firmly to neck of carboy. Can be operated by Air Pump No. 16986, or Foot Blower No. 1374..... **6.00**

136. **ADAPTERS, curved**, of light glass, lamp blown, bent at an angle of 45 degrees, for use with retorts and condensers.

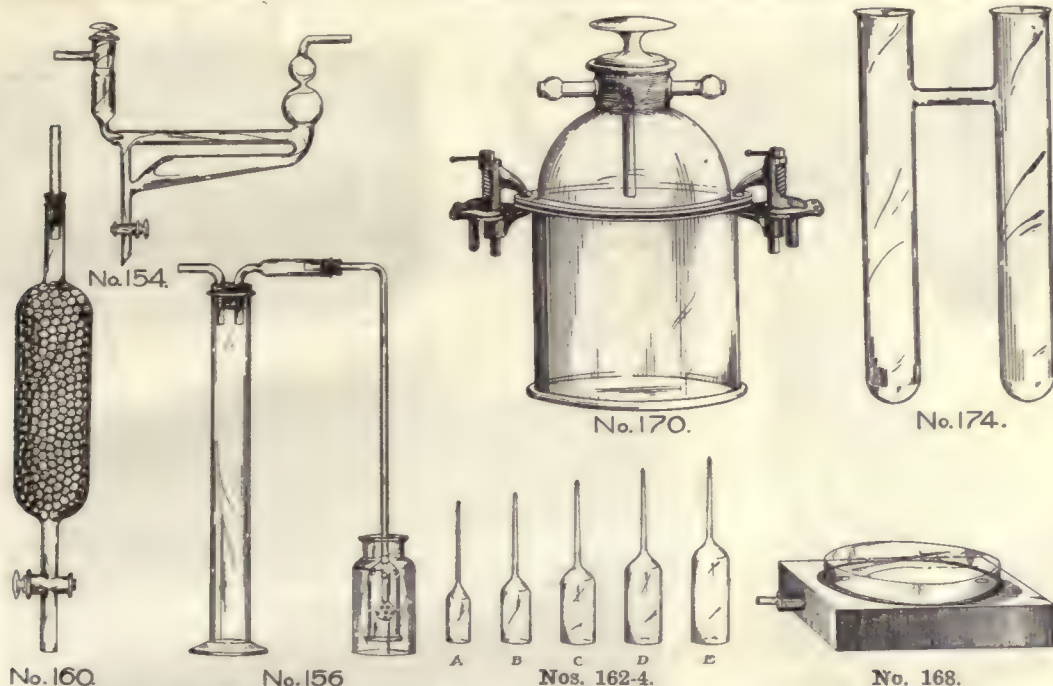
No.	A	B	C	D
Length, mm.	150	180	200	250
Inside diameter at large end, mm.	18	25	30	35
Each .....	.22	.25	.30	.35

138. **ADAPTERS**, same as No. 136, but straight.

No.	A	B	C	D
Each .....	.20	.22	.28	.32



140. **AEROSCOPE**, Rettger's, as described in the Journal of Medical Research, Vol. XXII, No. 3, pages 462 and 463. Size of tube, 6 x $\frac{3}{4}$ inches \$1.25
142. **AEROSCOPE**, Standard, adopted by the American Public Health Association for obtaining bacteria from air, according to the design of G. L. A. Ruehle, of the New York Agricultural Experiment Station. Consists of a tube, made of resistance glass to withstand sterilization, drawn down at the lower end to provide a shoulder for supporting a layer of cotton and sand. Length of tube, 110 mm; diameter outside, 15 mm. Complete with selected cork stopper and bent tube. (See Journal of Agricultural Research Vol. IV, No. 4, for July 1915)..... .45
- AGRICULTURAL APPARATUS**, see Soil Analysis Apparatus.
- AIR BATHS**, see Drying Ovens.
- AIR METERS**, see Anemometers.
- AIR PUMPS, BLOWERS**, see Blowers.
- AIR PUMPS** for Filtration, see Filter Pumps.
- AIR PUMPS** for Vacuum and Pressure, see Pumps, Air.
144. **AIR SAMPLING APPARATUS**, Palmer Water Spray, for testing dust and bacteria in air. The apparatus consists of an exhaust fan, connected directly to a universal motor, operating on a 110 volt circuit, which draws air through a venturi meter, the flow through which is indicated in cubic feet of free air per minute on an inclined manometer. The air to be sampled is drawn through a small quantity of filtered, sterilized water placed in the lower neck of a special glass vessel, and the dust and bacteria taken out. This water is then analyzed by standard methods, and calculations made for the number of dust particles or bacteria per cubic foot of air drawn through. The apparatus is enclosed in a mahogany case, 18 x 9 x 6 $\frac{1}{2}$ inches, with a damper on the top to regulate the rate of flow of air. Weight, about 15 pounds. (See Journal of Industrial and Engineering Chemistry, Vol. VI, No. 3, for March 1914; American Journal of Public Health, Vol. VI, No. 1, for January 1916; and Vol. VII, No. 1, for January 1917) 125.00
146. **AIR TESTER**, Wolpert's (Carbacidometer), for obtaining the amount of carbonic acid gas in a room by direct readings from the graduations etched on the glass, thus doing away with all computations and tables as in the old forms. Another advantage of this form is that the air of a room may be secretly tested, if desired. Directions and full set of capsules for making test solutions furnished with each instrument 4.00
147. **EXTRA CAPSULES** for No. 146. In boxes of 12 capsules (six of each reagent) ... Per box 1.00
150. **AIR THERMOMETER TUBE**, of glass, with stem 30 cm long. Diameter of bulb 50 mm.. .17
152. **AIR THERMOMETER TUBE**. Same as No. 150, but with capillary stem. Diameter of bulb 50 mm29



ALCOHOLOMETER, see Hydrometers.

ALKALIMETERS, see Carbon Dioxide Determination Apparatus.

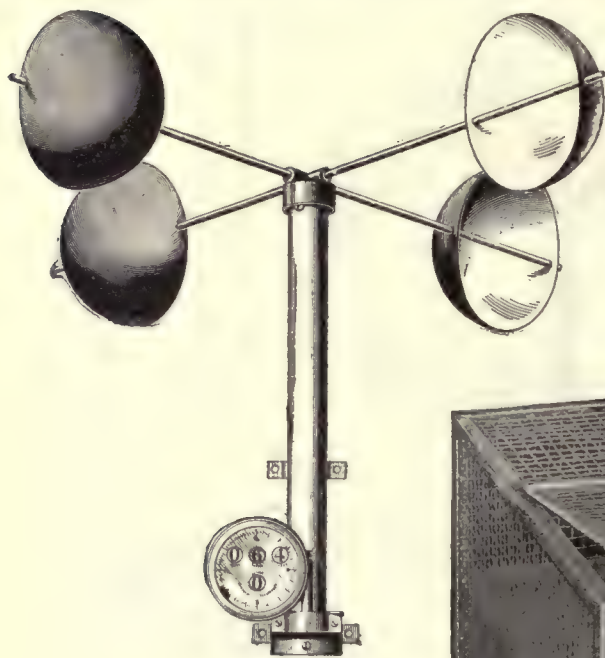
ALUNDUM CEMENT, COMBUSTION BOATS, CRUCIBLES, DISHES, FILTERS, ETC., see Cement, Combustion Boats, Crucibles, Etc.

AMMETERS, see Electrical Instruments.

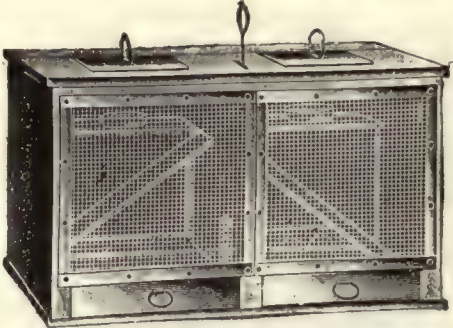
154. **AMMONIA ABSORPTION APPARATUS**, Cumming's, as modified by the Bureau of Standards, for the determination of ammonia in illuminating gas. Can be filled, emptied and rinsed, without disconnecting. Gives complete absorption when run at 0.6 cubic foot per hour. (See Circular 48, United States Bureau of Standards) \$6.50
156. **AMMONIA ABSORPTION APPARATUS**, Folin's, complete with Folin Absorption Tube, cylinder with rubber stopper, drying tube, and bottle. Height of cylinder, 12 inches; capacity of bottle, 6 ounces..... 3.25
157. **AMMONIA ABSORPTION TUBE**, Folin's. Tube only of No. 156..... 1.60
160. **AMMONIA ABSORPTION APPARATUS**, Referees', filled with glass beads. Adopted as official by the Metropolitan Gas Referees of London 4.75
162. **AMPOULES**, of clear resistance glass, with flat bottom.
- | No. | A | B | C | D | E | F | G | H | J | K |
|----------------|------|------|------|------|------|------|------|------|------|------|
| Capacity, cc.. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Per 100 | 1.75 | 1.75 | 2.50 | 2.50 | 3.25 | 3.25 | 3.50 | 3.50 | 4.00 | 4.00 |
164. **AMPOULES**, same as No. 162, but of amber glass.
- | No. | A | B | C | D | E | F | G | H | J | K |
|----------------|------|------|------|------|------|------|------|------|------|------|
| Capacity, cc.. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Per 100 | 1.75 | 1.75 | 2.50 | 2.50 | 3.25 | 3.25 | 3.50 | 3.50 | 4.00 | 4.00 |

ANAEROBIC CULTURE APPARATUS

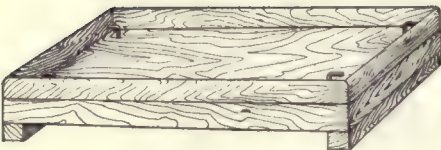
168. **ANAEROBIC CULTURE APPARATUS**, designed by H. M. Jones, of the United States Department of Agriculture. Consists of an Alberene stone base 2 cm thick and 12 cm square, with an annular groove to receive an inverted 100 mm Petri dish. The base is provided with outlet tubes so that gas and pyrogallate methods may be used. The groove may be sealed with paraffine or other wax. The small amount of air enclosed, about 20 cc, permits rapid results to be secured, which are readily visible. (See Journal of Bacteriology, Vol. I, No. 3, for May 1916, page 339)..... 2.25
170. **ANAEROBIC CULTURE JAR**, Novy's, for gas and pyrogallate acid methods, with removable top permitting Petri dishes to be used. The two sections can be clamped firmly together, and are furnished with a rubber gasket in addition to ground flanges, making an air tight joint. Height of lower section, 100 mm; diameter, 140 mm. Complete with three metal clamps and gasket 12.00
174. **ANAEROBIC CULTURE TUBE**, Giltner's H Tube, for the cultivation of anaerobic and other bacteria. The tube consists of two test tubes connected near their mouths by a short piece of glass tubing, permitting the culture to be placed in one tube and the chemicals in the other. Especially useful in determining the presence of and in isolating *Bacillus Abortus* from infected mucous membranes, as surface colonies may readily be obtained..... 1.10
- ANATOMICAL JARS**, see Jars, Specimen.



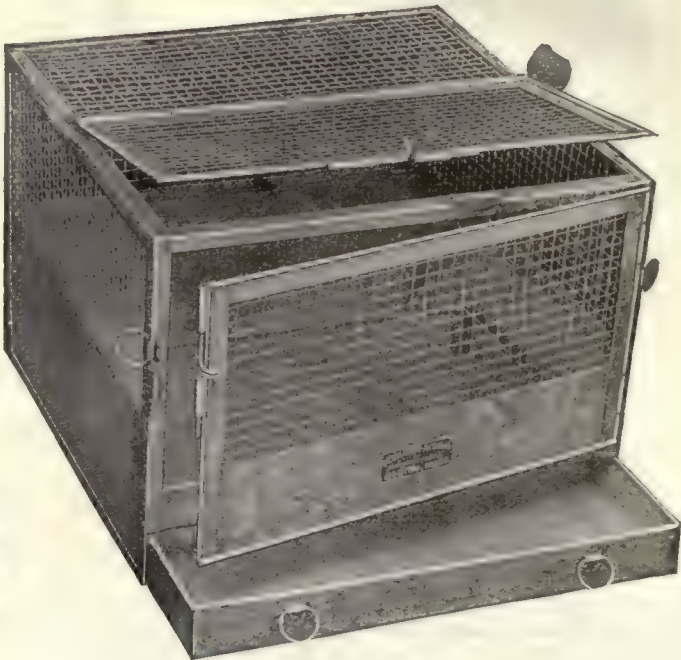
No. 184.



No. 192.

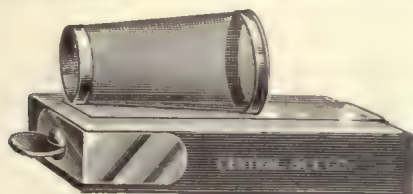


No. 186.



No. 188.

184. **ANEMOMETER or WIND GAGE**, for indicating the velocity of the wind in miles, consisting of a vertical shaft, to the upper end of which are fastened four arms, each carrying a Robinson hemispherical copper cup. These cups turn in one direction, regardless of the direction of the wind. The registering dial is so divided as to show velocities from one hundredth of a mile to 10,000 miles. All parts are interchangeable. Each instrument is standardized and fully warranted. Weight, $3\frac{1}{2}$ lbs. \$30.00
186. **ANIMAL BOARDS**, of wood, with hook in each corner, for use in animal experiments. Small size suitable for guinea pigs and rats; large size for cats and small dogs.
- | No. | A | B |
|-------------|------|------|
| Length, mm. | 320 | 650 |
| Width, mm. | 200 | 300 |
| Each | 3.25 | 4.00 |
188. **ANIMAL CAGE**, scientifically designed and constructed, affording humane conditions and entire security and convenience in studying animals undergoing bacteriological or microscopical examination. The removable pan in the bottom renders the daily care of the animals easy, and permits the employment of every precaution for insuring cleanliness. Dimensions: 18 inches long, 18 inches wide, and $13\frac{1}{2}$ inches high 12.00
192. **ANIMAL CAGE, Heim**, with two compartments, for breeding mice and other small rodents. Made of wood, lined with galvanized iron, with shelf for food, runway of wire cloth and removable drawers. Dimensions, $20 \times 12 \times 12$ inches 12.00
194. **ANIMAL CAGE, Vaughan's**, collapsible, rendering it easy to sterilize. Sides, bottom, and top come apart so that it can be packed away in small space. Height of cage, 12 inches; length, 20 inches; width, 15 inches; height over all, 17 inches 15.00
- (For illustration, see page 13.)



No. 200.



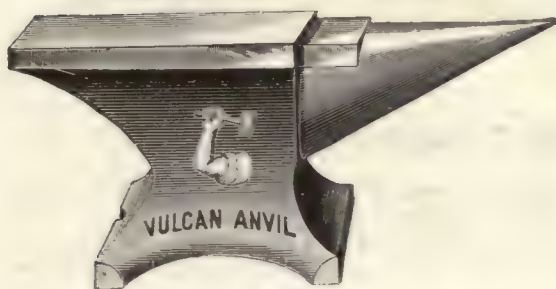
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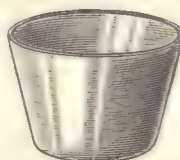
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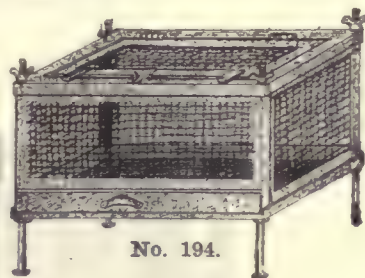
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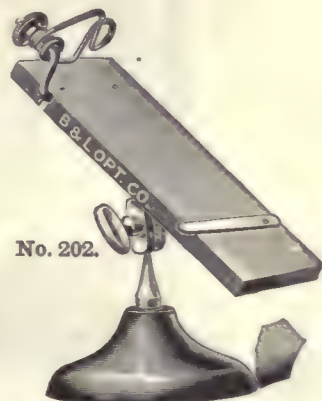
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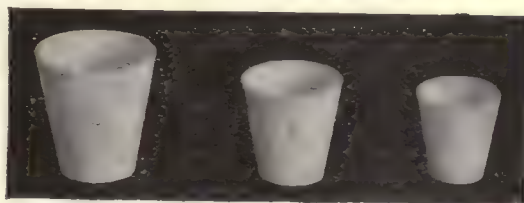
No. 216.



No. 194.



No. 202.



No. 214.

196. **ANIMAL CAGE, Mouse Jar**, of glass, 5 inches in diameter by 7 inches high, with wire gauze top loaded with a heavy cast iron knob..... \$1.60
- 8042C. **GLASS JAR** only of No. 196, 5 x 7 inches..... 1.05
- ANIMALCULAE CAGES**, see Projection Apparatus.
- For **INSECT CAGES**, see Nos. 8000 and 8004.
200. **ANIMAL HOLDER**, of metal, for inoculating mice, with adjustable clamp for holding the tail. Cage may be removed from base..... 2.00
202. **ANIMAL HOLDER, Kitasato's Mouse Holder**. A nickel-plated metal table, fully adjustable by means of a ball and socket joint, with adjustable head holder and tail or leg clamp. With this holder the mouse may be placed in position without assistance..... 4.80
204. **ANIMAL HOLDERS, Voge's Guinea Pig Holders**, for inoculation, measurement of temperature, etc. Consists of a slotted cylinder with perforated base.
- | No. | A | B |
|--------------|-----|------|
| Height, mm | 180 | 200 |
| Diameter, mm | 60 | 80 |
| Each | .90 | 1.25 |
214. **ANNEALING CUPS**, of selected clay. Used extensively for silica fusions.
- | No. | 0 | 1 | 2 |
|--------------|------------------------------------|------------------------------------|------------------------------------|
| Size, inches | $1\frac{1}{8} \times 1\frac{1}{8}$ | $1\frac{1}{4} \times 1\frac{1}{4}$ | $1\frac{1}{2} \times 1\frac{1}{2}$ |
| Per dozen | 1.75 | 1.75 | 1.74 |
215. **ANNEALING CUP COVERS**.
- | For cups No. | 0 | 1 | 2 |
|--------------|-----|-----|-----|
| Per dozen | .40 | .40 | .40 |
216. **ANNEALING CUP, Porcelain**, glazed inside and outside except on bottom. Diameter at top, 38 mm; diameter at bottom, 26 mm; height, 25 mm; capacity, 15 cc..... .18
218. **ANVIL, Plattner's**, of polished steel, for blowpipe analysis. Dimensions, $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{2}$ in. .80
220. **ANVILS, Regular Shape**, steel face.
- | No. | A | B | C |
|---------------------------|------|-----------------|-----------------|
| Weight in pounds | 15 | 50 | 100 |
| Length in inches over all | 9 | $14\frac{1}{2}$ | $20\frac{1}{2}$ |
| Each | 5.50 | 10.00 | 17.00 |
224. **ANVIL, Square**, for lead buttons, 6 x 6 inches, of iron, one side planed..... 1.75



No. 236.



No. 238.



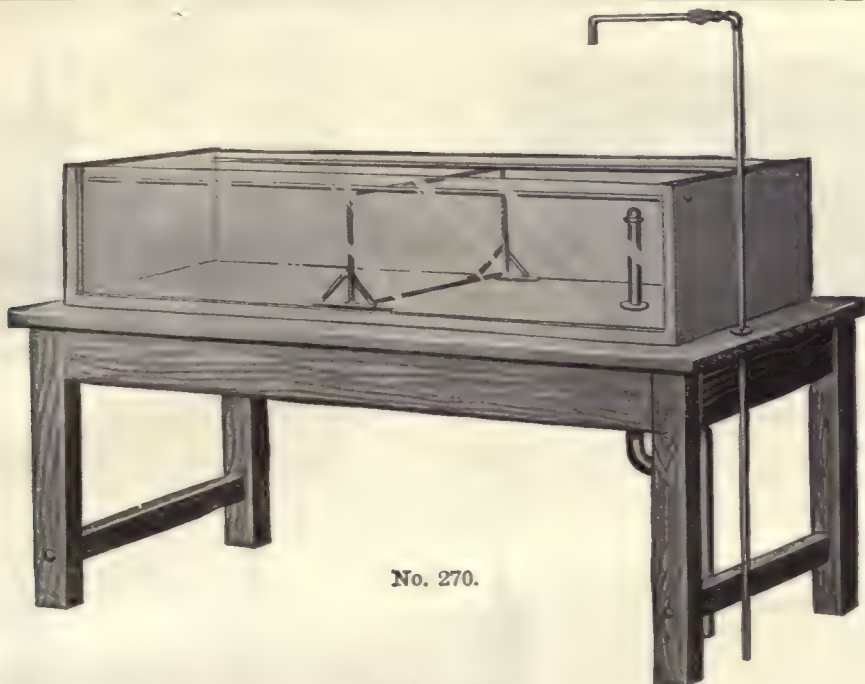
No. 254.



No. 260.

APRONS, OVERSLEEVES AND LABORATORY COATS

236. **APRON**, light weight, of pure black rubber cloth, acid and waterproof, very flexible, accommodating itself easily to any position of the body. Length, 48 inches..... \$0.90
238. **OVERSLEEVES**, of same material as No. 236 Apron, with elastic bands at top and bottom .50
240. **APRON**, of pure white rubber cloth, especially suitable for use in bacteriological and biological laboratories. Length, 48 inches..... 1.30
242. **OVERSLEEVES**, of same material as No. 240 Apron, with elastic bands at top and bottom.
Per pair..... .70
244. **APRON**, heavy weight, of pure maroon rubber cloth, of highest quality, very durable and resistant to chemical reagents. Length, 48 inches..... 1.50
246. **OVERSLEEVES**, of same material as No. 244 Apron, with elastic bands at top and bottom.
Per pair80
248. **APRON**, of heavy, fine white duck (not acid proof), with strap at neck and attached tie strings, to protect clothing from flour and grease. Widely used in flour and milling laboratories. Length, 50 inches..... .85
250. **APRON**, Asbestos, fire and acid proof, made of best medium weight Canadian asbestos cloth. Length, 48 inches; width, 24 inches..... 7.50
252. **LABORATORY COAT**, of white drill, affording complete protection to the clothing. Widely used in bacteriological, biological, food and flour laboratories. Buttons are easily removable for laundering; with three pockets and adjustable strap in back. Length, 54 inches. In ordering, give chest measure taken loose fitting 3.00
254. **LABORATORY COAT**, of tan covert cloth, with three pockets, side slits, removable buttons, and sleeves buttoning close to wrist. Length, 50 inches. In ordering, give chest measure taken loose fitting..... 3.00
256. **LABORATORY COAT**, of linen drab duck, very heavy, extensively used in chemical and testing laboratories. With four large brass riveted pockets, brass ball-and-socket buttons, sleeves buttoning close to wrist, side slits, and strap at back. Length, 54 inches. In ordering, give chest measure taken loose fitting..... 5.00
258. **DISSECTING OR OPERATING GOWN**, short sleeved, of white drill, with one pocket and straps for fastening at neck and waist. Especially suitable for bacteriological and anatomical laboratories. Length, 52 inches. (Can be furnished in 58 inch length if desired.) In ordering, give chest measure taken loose fitting..... 2.30
260. **DISSECTING OR OPERATING GOWN**, same as No. 258, but with long sleeves. Length, 52 inches. (Can be furnished in 58 inch length if desired.) In ordering, give chest measure taken loose fitting 2.40



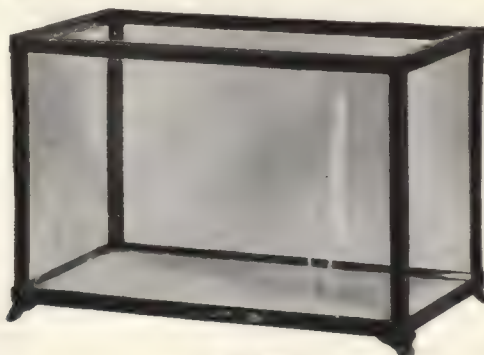
No. 270.

AQUARIA

270. **AQUARIUM. Tank and Table**, handsome in appearance, and exceptionally well built. The ends and bottom are made of Alberene stone, with front and back of clear plate glass. The glass is set in the stone, and cemented water-tight. Brass rods along the top edges of the glass add to its rigidity. The plumbing fixtures supplied consist of a vertical supply pipe of brass, nickel-plated, with one outlet controlled by a valve; one vertical overflow plug and trap; and piping to the floor line. All piping and fittings are of brass. The wire gauze partition is of brass, and is used to divide the aquarium into two sections of varying sizes, as the partition is movable. The table is very heavy and substantial, of oak, with 1½ inch birch top. The tank measures outside, 50x24x15 inches deep. The table top measures 58x32x30 inches high.

The top of the table is furnished in natural water-proof finish; the body of the table is given one coat of filler and two coats of cabinet rubbed varnish, light antique, unless otherwise ordered. Weight of the table crated, 180 pounds; of the tank, 400 pounds. Complete as described above with tank, table and fixtures **\$93.00**

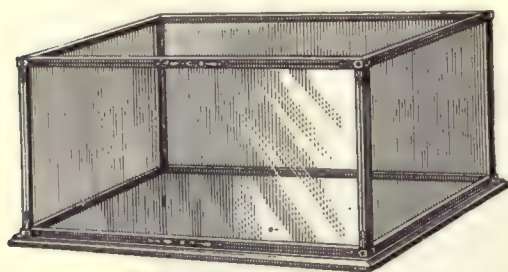
271. **AQUARIUM TANK** only, with fixtures, as described under No. 270..... **70.00**
 272. **AQUARIUM TABLE** only of No. 270..... **23.00**



No. 274.

274. **AQUARIA**, steel frame, slate bottom, heavy glass sides; well made and nicely finished. The measurements in the table below are in inches over all.

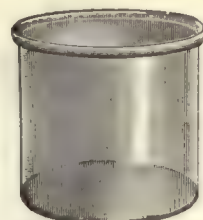
No.	A	B	C	D	E
Length, inches	12½	16½	18½	20½	22½
Width, inches	7	9	11	13	13
Height, inches	10	11	12	13	14
Capacity, gallons	3	6	9	12	15
Each	4.80	5.80	7.00	8.00	10.50



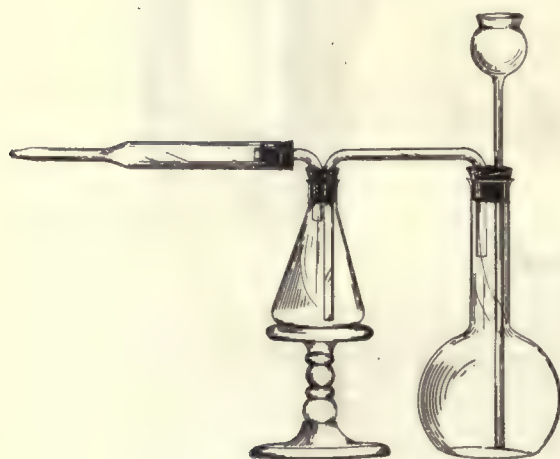
No. 276.



No. 8042.



No. 286.



No. 290.

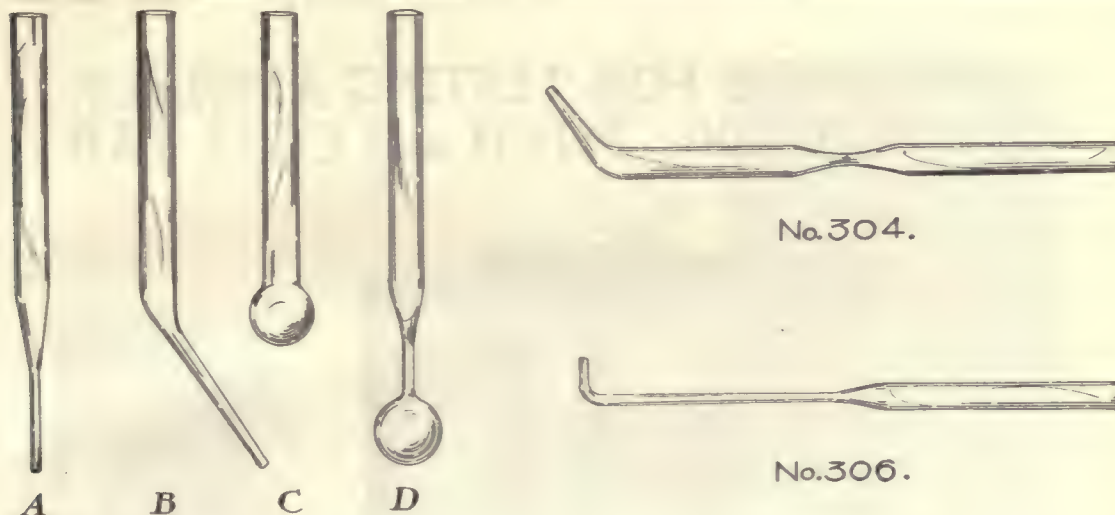


No. 294.



No. 296.

276. **AQUARIUM**, iron frame, slate bottom, heavy glass sides; strong and durable. An entirely satisfactory and serviceable aquarium. Dimensions over all: 26½ inches long, 17 inches wide, and 15 inches high. Capacity, 20 gallons \$19.80
278. **AQUARIUM**, same as No. 276, but provided with inlet nipple with lock nuts, and outlet fitting with double standpipe. The construction of this standpipe prevents clogging of the outlet and consequent overflow..... 27.80
280. **AQUARIUM**, same as No. 276, but with plate glass sides, and with over all dimensions: 39 inches long, 19 inches wide, and 21 inches high. Capacity, 50 gallons..... 47.60
282. **AQUARIUM**, same as No. 280, but with inlet nipple and outlet with double standpipe, as described under No. 278..... 55.60
8042. **AQUARIA, Battery Jars**, of clear white glass, with ground rim.
- | No. | A | B | C | D | E |
|-------------------|-----|-----|------|------|------|
| Diameter, mm..... | 100 | 100 | 125 | 150 | 225 |
| Height, mm..... | 100 | 125 | 175 | 200 | 300 |
| Each | .55 | .70 | 1.05 | 1.25 | 3.10 |
286. **AQUARIA, Round**, of white glass, with reenforced rim.
- | No. | A | B | C | D |
|-----------------------------------|------|------|------|------|
| Diameter, mm | 175 | 225 | 250 | 300 |
| Height, mm | 175 | 225 | 250 | 300 |
| Approximate capacity, liters..... | 4 | 8 | 12 | 20 |
| Each | 1.65 | 2.50 | 3.75 | 5.35 |
290. **ARSENIC APPARATUS, Fresenius**, consisting of a 500 cc Florence flask with two-hole stopper, connected by a glass tube to a 100 cc Erlenmeyer flask with rubber stopper and outlet tube. Without support 1.70
294. **ARSENIC APPARATUS, Gutzeit-Bragg**, with ground joints 2.00
296. **ARSENIC APPARATUS, Marsh**, with glass stopcock, on polished wooden support..... 2.50
297. **ARSENIC APPARATUS**, glass parts only of No. 296..... 1.75
300. **ARSENIC PLATE (Streak Plate)**, of unglazed porcelain for arsenic tests, 60x100x4 mm thick40



No. 302.

302. ARSENIC TUBES, of hard glass.

Style	A	B	C	D
Each	\$0.12	.14	.16	.16

304. ARSENIC TUBE, of Pyrex combustion tubing, with constriction. Length, 15 inches... .60

306. ARSENIC TUBE, of transparent silica. Length over all, 6 inches; length of constriction, 3 inches. May be used repeatedly..... \$1.50

ASBESTOS MATERIAL

308. ASBESTOS CEMENT (Retort Cement), fire and acid proof, for use with muffles, retorts, electric furnaces, etc. Put up in cans ready for use.

Weight, pounds	1	5
Each	.30	.90

310. ASBESTOS CLOTH, 36 inches wide, unaffected by acid, fire, etc.

Description	Fine.	Medium.	Heavy.
Weight per yard, lbs.	1 1/2	2 1/4	2 1/2
Per yard	4.00	5.40	6.80

312. ASBESTOS CORD or TWINE, in 1 pound balls.

No.	A	B
Diameter, inches	1/16	1/8
Per lb.	2.75	2.75

ASBESTOS GLOVES AND MITTENS, see Gloves.

314. ASBESTOS PAPER for filtering acids, in rolls 36 inches wide, weighing about 1 pound to the square yard. Thickness, about 0.028 inch.....Per lb. \$0.40

316. ASBESTOS PADS, 1/8 inch thick, with iron bound edges; for protecting table tops, etc.

No.	A	B	C	D
Dimensions, inches	8 1/2 x 8 1/2	11 x 11	15 x 15	10 x 16
Each	.30	.45	.70	.60

318. ASBESTOS PLATE or PAD, round, with iron bound edges and ring for suspension. Diameter, 8 inches......10

320. ASBESTOS SHEET, 40x40 inches, fire and acid proof.

Thickness, inches	1/32	1/16	1/8	3/16	1/4	3/8	1/2
Weight per sheet, lbs.	2	4	8	12	16	20	32
Per square foot	.10	.20	.50	.75	.90	1.20	1.70
Per sheet	.60	1.20	3.00	4.50	5.50	7.20	10.20

322. ASBESTOS SHEETS, square, 1/16 inch in thickness.

No.	A	B
Dimensions, inches	4x4	6x6
Per dozen	.20	.45

ASBESTOS SLATE, Transite, acid-proof, for protecting table tops, building apparatus, etc. The best laboratory material for heat and electrical insulation. Can be cut with ordinary saw.

Thickness, in.	1/8	3/16	1/4	3/8	1/2
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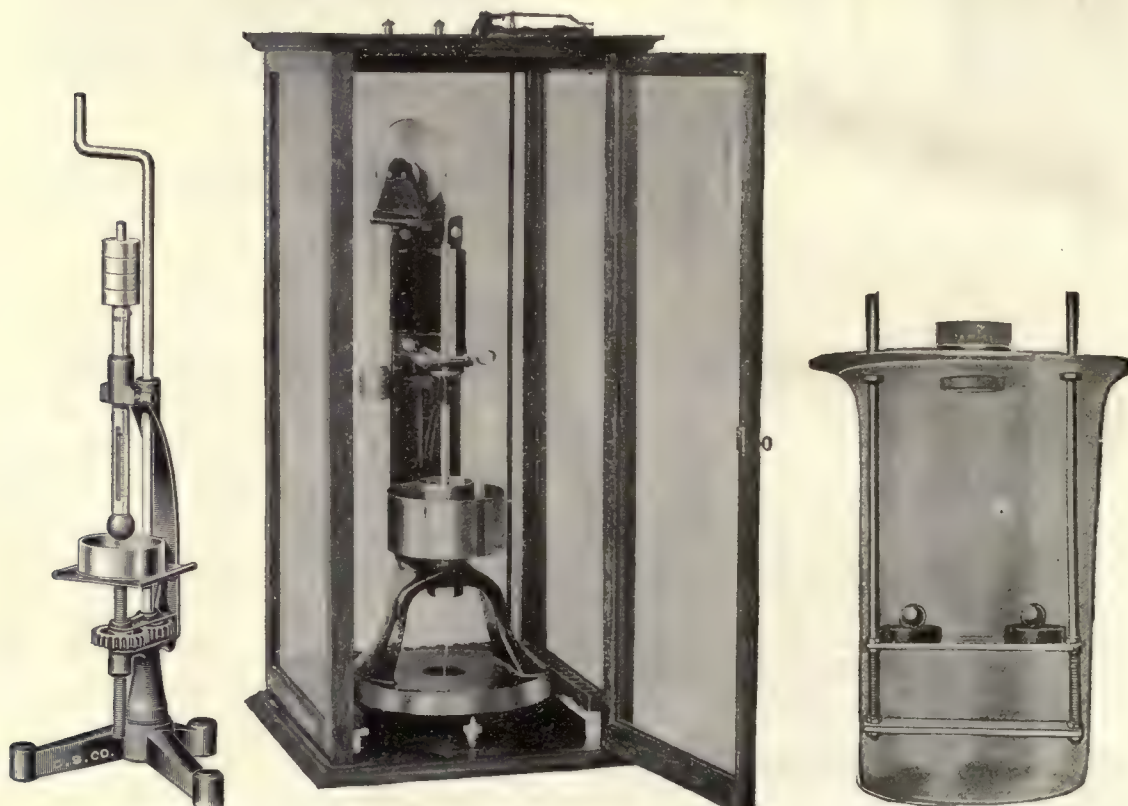
- 324A. ASBESTOS SLATE, 42x48 in....Per sheet 2.70 4.10 5.40 8.00 10.70

- 324B. ASBESTOS SLATE, 42x96 in....Per sheet 5.40 8.20 10.80 16.00 21.40

- 324C. ASBESTOS SLATE.....Per sq. ft. .30 .45 .60 .90 1.20

326. ASBESTOS SLATE SQUARE, 12x12x1/8 in. Superior to an asbestos pad..... .30

APPARATUS FOR TESTING ASPHALT, CREOSOTE OIL, PITCH and COAL TAR



No. 328.

No. 330.

No. 332.

328. **ADHESION MACHINE**, Kirschbraun's, for measuring the adhesive strength of asphalt as a binder for crushed rock in paving construction. Consists of a dynamometer reading to 250 grams in 10 gram divisions, mounted on a frame provided with a movable table for holding box containing sample to be tested. A handle with a system of gears is used to press the sample against the ball on the end of the dynamometer and then to remove it, the scale recording the adhesive pull. As used in the Chicago Paving Laboratory. Complete with two sample cups and directions..... \$25.00
330. **ADHESIVEMETER**, Brown's, for determining the index of adhesion of materials such as road oils and asphalts, by the time consumed for a standard rod to travel a given distance. The results obtained check very closely. Consists of a rigid cast iron frame, mounted on leveling screws; a steel rod, which is attached to counterbalancing weights by means of a string over a frictionless pulley; and a cup for the samples, immersed in a water bath. .155.00
331. **GLASS CASE** for No. 330, with electric heaters 60.00
332. **BALL AND RING APPARATUS**, American Society for Testing Materials Type, as described in Tentative Method No. D36-16T for the Determination of the Softening Points of Bituminous Materials other than Tar Products. The apparatus consists of a 600 cc glass beaker, an aluminum rack with two plates for the rings; a brass cover with hole for cork to hold thermometer; two brass rings $\frac{3}{8}$ inch in diameter, $\frac{1}{4}$ inch deep with $\frac{3}{32}$ inch walls; and two steel balls $\frac{3}{8}$ inch in diameter, each weighing between 3.45 and 3.50 grams; with directions for use. Without thermometer..... 10.00
333. **BALL AND RING** only of No. 332..... 1.00
- 13428A. **THERMOMETER** for No. 332, reading to to 220°F..... 1.20



No. 338.



No. 340.

338. **CENTRIFUGAL EXTRACTOR, Dulin Rotarex No. 1, capacity 50 grams.** Will give complete extraction of bituminous aggregates in five minutes. The large size sample insures greater accuracy in the analysis of coarse aggregates and will also extract enough bitumen to be used for tests on the asphaltic cement. Consists essentially of a 110 volt A. C. or D. C. motor mounted vertically on a cast iron base, directly connected to the aluminum extraction bowl. The bowl is surrounded by a cylindrical copper shell, shaped to drain through a spout at the side. The solvent is introduced into the extraction bowl through the funnel shaped screw which holds the filter ring and cover in place. The outer cover is made in two pieces so that the section immediately over the funnel may be removed when the solvent is added. Complete with rheostat, cord with plug for attaching to lamp socket, and directions for operating \$71.50

Extra Parts for Dulin Rotarex No. 1

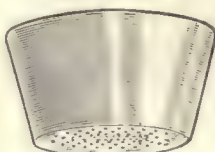
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|---|--------------|
| 338A. ALUMINUM BOWL, 50 grams capacity..... | 6.00 |
| 338B. COVER for 50 gram Bowl..... | 2.00 |
| 338C. FILLER SCREW for 50 gram Bowl..... | 2.00 |
| 338D. FILTER RINGS for 50 gram Bowl..... | per 100 2.00 |
| 338E. ALUMINUM BOWL, 100 grams capacity..... | 8.00 |
| 338F. COVER for 100 gram Bowl..... | 2.75 |
| 338G. FILLER SCREW for 100 gram Bowl..... | 2.00 |
| 338H. FILTER RINGS for 100 gram Bowl..... | per 100 2.00 |
| 340. CENTRIFUGAL EXTRACTOR, Dulin Rotarex No. 2, capacity 1,000 grams, with direct drive
vertical type motor for 110 volts A. C. or D. C., enclosed in cast iron frame. Complete with
rheostat, cord with plug for attaching to lamp socket, and directions for operating..... | 128.00 |

Extra Parts for Dulin Rotarex No. 2

- | | |
|---|--------------|
| 340A. ALUMINUM BOWL, 1,000 grams capacity..... | 10.00 |
| 340B. COVER for 1,000 gram Bowl..... | 5.00 |
| 340C. FILLER SCREW for 1,000 gram Bowl..... | 2.00 |
| 340D. FILTER RINGS for 1,000 gram Bowl..... | per 100 5.00 |
| 341. ATTACHMENT PLUG for Nos. 338 or 340, to screw into a 220 volt lamp socket, permitting the
Rotarex to be connected in series with a 110 volt lamp, when 220 volt circuit only is avail-
able | 1.25 |



No. 342.



No. 3414.



No. 346.



No. 348.



No. 356.



No. 357.

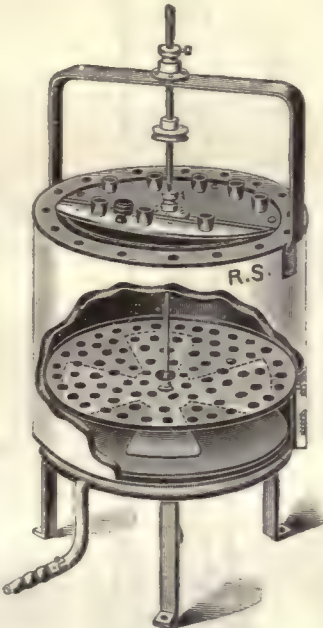
342. **COVER**, of brass, for 400 cc beaker, for use in determining melting point of asphalts by cube method. With openings for thermometer and wire, the former so shaped as to enable the mercury column to be read at the level of the cover. Without thermometer or wires. (See Bulletin 314 of the United States Department of Agriculture)..... \$0.80
3414. **CRUCIBLE**, Gooch, best American porcelain, of special form with large filtering surface, for determining bitumen soluble in carbon disulphide. Height, 24 mm; width at bottom, 35 mm; width at top, 45 mm; capacity, 30 cc..... .50
346. **CUPS OR SAMPLE BOXES** for asphalt, of tin plate, as recommended by the American Society for Testing Materials. Diameter, about $2\frac{3}{16}$ inches; depth, about $1\frac{1}{8}$ inches. Per dozen..... .75
348. **DEHYDRATING APPARATUS** for Tars and Creosote Oils, as used in the laboratories of the Barrett Manufacturing Co. and the United States Office of Public Roads, and recently adopted as standard by the American Society for Testing Materials. Consists of a cylindrical copper still 15.8 cm high and 9.5 cm in diameter, supported on an iron stand and fitted with a lid provided with clamp and thumb screw. The condenser consists of a copper jacket 38.75 cm long with inner glass tube set at an angle of 75°. A special combined separatory funnel and burette is furnished, with a capacity of 120 cc with outlet tube graduated in $\frac{1}{2}$ cc divisions. Complete as illustrated, with copper still, connecting tube, ring burner of brass, condenser, separatory funnel, supports and clamps, but without thermometer. (See Journal of Industrial and Engineering Chemistry, Vol. III, No. 4, for April 1911; also Bulletin 314 of the United States Department of Agriculture)..... 38.50
350. **THERMOMETER** for No. 348, graduated from 0° to 400°C. in 1° divisions according to the requirements of the American Society for Testing Materials..... 7.50

Extra Parts for No. 348

351. **COPPER STILL**, with cover, clamp and thumb screw, with tubulature for connecting tube, and with 6 paper gaskets. Height inside, 15 cm; diameter inside, 8.7 cm..... 20.00
- 2110C. **RING BURNER**, of brass, for use with No. 351 2.20
353. **CONNECTING TUBE**, of glass, with side arm20
354. **CONDENSER**, of copper, on support, without inner tube..... 10.00
355. **INNER TUBE** for No. 354, of glass, about 55 cm long..... .40
356. **SEPARATORY FUNNEL**, with stopcock, capacity 120 cc, with outlet tube graduated in $\frac{1}{2}$ cc divisions 4.00
357. **DISH**, Evaporating, for use in evaporation test, of pure nickel, with flange and handle... 1.50



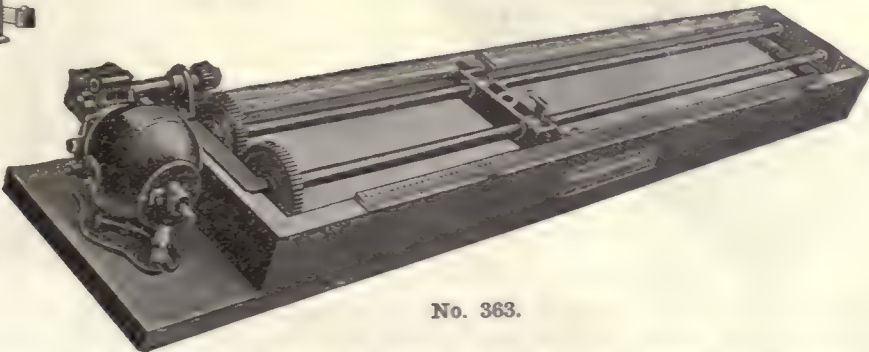
No. 358.



No. 360.



No. 362.



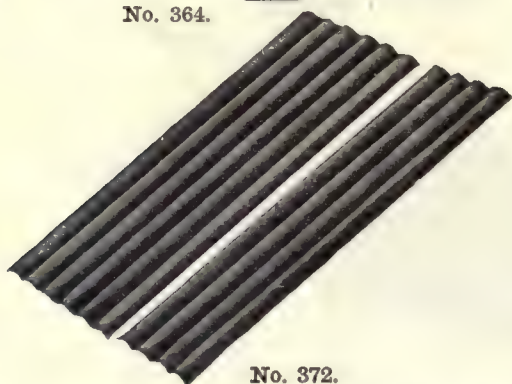
No. 363.

358. **DISTILLATION APPARATUS** for Tars, American Society for Testing Materials Type, as described in Bulletin 314 of the United States Department of Agriculture, and in Standard Method D20-16 for the Distillation of Bituminous Materials Suitable for Road Treatment. Consists of a 250 cc Pyrex Engler flask, supported on a ring stand and surrounded by a metal shield with sight hole. The side arm is connected by a rubber stopper to a special type of condenser. Complete with flask, shield, condenser, 25 cc graduate, support stand, two clamps and 4 inch ring, but without burner or thermometer \$6.00
- THERMOMETER** for No. 358, see No. 350.
360. **DRYING OVEN**, New York Testing Laboratory Type, of Russia iron, double walled, covered with asbestos. The heat is supplied by a 10 inch ring burner immediately beneath the air space between the two walls. The interior of the oven is provided with a perforated shelf, beneath which is a fan for insuring even temperature. The cover is hinged and provided with openings for thermometer, thermo-regulator, etc. Height, 20 inches; diameter, 11 inches. Without thermometer and thermo-regulator 27.50
361. **DRYING OVEN**, of same construction as No. 360, but of copper..... 37.50
362. **DUCTILITY MACHINE**, Smith's, improved form, for hand power, built in a stone trough heavily enamel painted both inside and out. Arranged for 110 cm pull, and for three briquettes. All working parts are of brass. With hand wheel.....160.00
363. **DUCTILITY MACHINES**, Smith's, improved form, electrically driven, with direct connected motor.

No.	A	B	C	D
	A. C.	A. C.	D. C.	D. C.
For, volts	110	220	110	220
Price	225.00	250.00	200.00	225.00



No. 364.



No. 372.



No. 370.



No. 372.

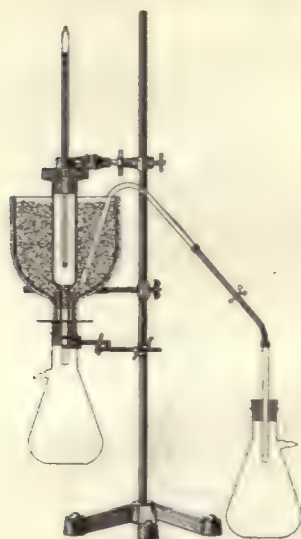


No. 366.



No. 368.

364. **EVAPORATOR, Brown.** Will reduce asphaltic petroleum to asphalt in $\frac{1}{3}$ th the time usually required by the ovens commonly used, giving results that will agree among themselves. Consists of a cylindrical iron oil bath, 4 inches high by 18 inches in diameter, fitted with a stirring device mounted vertically with a grooved pulley at the top for belting to a motor. The top of the bath is of aluminum with pockets for the brass evaporating dishes. A special ring gas burner supplies heat under the entire bottom of the oil bath. Complete with wells for thermometer, air gage, vent pipe, opening for filling, and a set of brass evaporating dishes \$53.00
366. **EXTRACTION APPARATUS, American Society for Testing Materials type,** for free carbon in tars and pitches. Consists of a flask of special shape, with spiral metal condenser of Cottle form, and wire support for filter cup 4.50
5227. **CONDENSER** only of No. 366, of block tin with cover attached 2.25
- 366A. **FLASK** only of No. 366 1.25
- 366B. **WIRE SUPPORT** only of No. 366 1.00
368. **EXTRACTION APPARATUS, New York Testing Laboratory Type,** for the extraction of bituminous material from paving mixtures containing broken stone. Consists of a metal cylinder, inside which fits a second cylindrical metal vessel which holds the solvent. A wire basket holding 500 grams of the disintegrated paving material is suspended in the inner vessel, and an inverted conical condenser provided with outlets for water circulation is placed in the top. The heat is supplied by a 16 C. P. incandescent lamp, mounted on the wooden base and projecting into the bottom of the outer cylinder. With 175 to 200 cc of carbon disulphide, 500 grams of sample should extract clean in three hours. Complete, without lamp bulb 35.00
- ALUNDUM THIMBLES** for No. 366, see No. 5244.
370. **FLASH POINT TESTER, Elliott or New York State Board of Health Type,** as modified by the Underwriters' Laboratories, with Bunsen burner and with Thermometer No. 13444A. 10.00
372. **FLOW PLATE AND MOLD** for comparing fluidities of asphalt cements at their melting points. Set consists of two flow plates, each with six corrugations, and mold 6.00



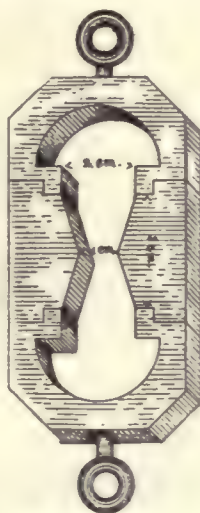
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No. 379.



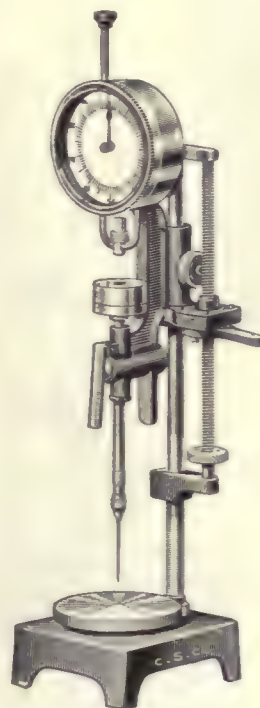
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No. 381.



No. 376.



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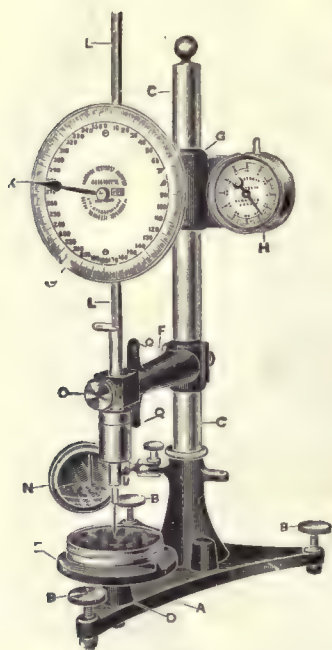


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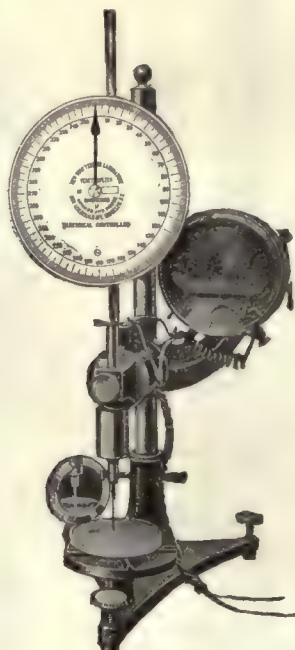


No. 382.

- 374 **FREEZING APPARATUS**, designed by Prevost Hubbard, of the United States Office of Public Roads, for determining the percentage of paraffine scale in bituminous materials. Consists of an inverted bell jar surrounded by a cover of felt. A copper jacket is held in the neck of the bell jar by a rubber stopper. A glass filter tube wrapped with blotting paper fits inside the copper jacket, and extends through the rubber stopper which fits into the 500 cc filter flask. Complete with support stand, clamps, bell jar, two 500 cc filter flasks, rubber stopper, etc., as illustrated, but without thermometer. (See Bulletin 314, United States Department of Agriculture)..... \$15.00
375. **THERMOMETER, Special**, for No. 374, graduated from -25°C to 0°C in $\frac{1}{2}^{\circ}$ divisions, with -20° mark at least 14 cm from bulb..... 5.00
376. **HOLDER for Bitumen, Draper type**..... 3.50
379. **HYDROMETER, Sommer** (patented), recommended by the Committee of the American Society of Civil Engineers. Consists of small cylindrical vessel in two parts, the upper one of which takes up the shrinkage and can be removed after chilling. The lower part contains exactly 10 cc. The specific gravity is determined by suspending it from the hook of a special hydrometer, graduated to read directly from 0.850 to 1.300 at 25°C . Complete with brass receptacle and fittings, with directions for use. (See Journal of Industrial and Engineering Chemistry, Vol. II, No. 5, for May, 1910)..... 12.00
380. **HYDROMETER, Sommer**, same as No. 379, but with hydrometer graduated from 0.950 to 1.100 12.00
- HYDROMETERS for Creosote Oil**, see general heading **Hydrometers**.
381. **MOLD, Asphalt Briquette**, of brass, for use in ductility machine, with removable center pieces 5.00
382. **MOLD, Cube**, of brass, with brass plate, for two one-half inch cubes for melting point test 5.00
383. **MOLD, Cube, Barrett type**, of brass, for one-half inch cubes, with iron clamp..... 3.00
384. **OVEN, Melting Point, or Air Bath, Barrett type**, for the determination of the melting point of tar. Consists of copper cylinder with observation window of mica. Inner vessel of copper can be removed for cleaning..... 10.00
386. **PENETROMETER, Humboldt**, latest improved form with fine adjustment, for determining the consistency of bituminous solids, by means of the penetration of a No. 2 Roberts' needle at 77°F . under a definite load in a given time. For loads of 50, 100, and 200 grams, with dial graduated in 100 divisions of $\frac{1}{40}$ mm each..... 60.00



No. 388.



No. 389.



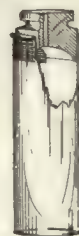
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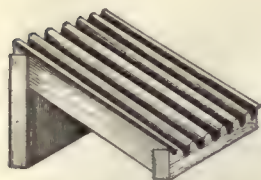


No. 392.



No. 1734.

388. **PENETROMETER, Standard, New York Testing Laboratory type.** Operates on the same principle as the Humboldt, but is provided with stop-clock for timing the duration of the test by half-second beats, and with dial graduated in 360 degrees, each of which represents $\frac{1}{40}$ mm of penetration. With adjustable weights for loads of 50, 100, and 200 grams, leveling screws, adjustable platform and adjustable mirror for lighting the specimen. For full description, see Richardson "The Modern Asphalt Pavement," page 565..... \$68.00
389. **PENETROMETERS, Electrically Controlled,** similar to No. 388, but with magnetic control, which entirely eliminates the personal equation. Adaptable to 1.5 or 60 second penetrations. Type A includes a rectifier to convert the alternating into direct current.
- | | | |
|------------------|----------|----------|
| No. | A | B |
| For, volts | 110 A.C. | 110 D.C. |
| Each | 175.00 | 150.00 |
390. **PENETROMETER, Miniature,** for portable work, about half the size of the standard instrument, with same needle. Without clockwork 30.00
391. **PENETRATION NEEDLE,** improved form, designed by Charles S. Reeve and Fred P. Pritchard of the Office of Public Roads and Rural Engineering of the United States Department of Agriculture, and adopted as standard by the American Society for Testing Materials. (See Journal of Agricultural Research, Vol. V, No. 24, for March 13, 1916, page 1121).... .60
392. **PYKNOMETER, Barrett Type,** 50 cc capacity, for specific gravity of tar and pitch. (See Journal of Industrial and Engineering Chemistry, Vol. V, No. 3, for March 1913, page 195) 2.00
1734. **PYKNOMETER, Hubbard's,** for fluid and semi-solid bitumens, designed by Prevost Hubbard of the Office of Public Roads. Consists of a heavy tube 70 mm long and 22 mm in diameter, with accurately ground stopper made concave on under side. A hole 16 mm in diameter passes through stopper and connects with this hollow space, permitting air to escape easily. Capacity, about 24 cc; weight empty, about 28 grams. (See Bulletin 314, of the United States Department of Agriculture)..... 2.00



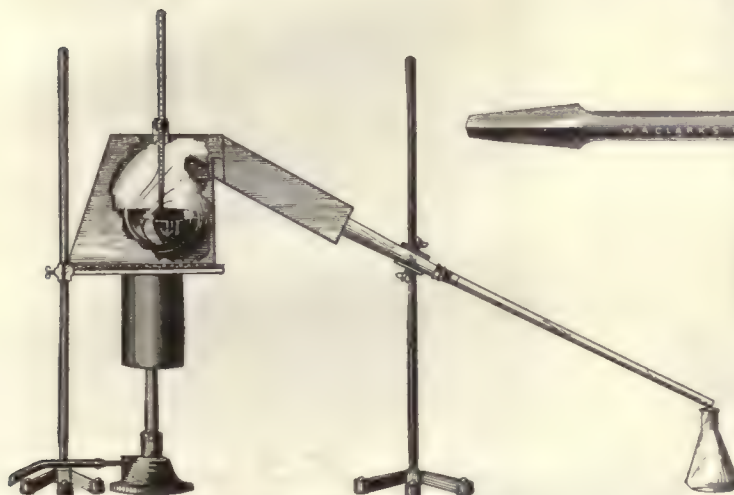
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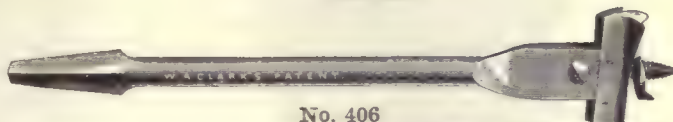
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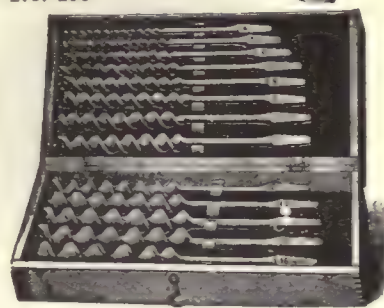
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Nos. 394, 5 and 6 assembled.



No. 406

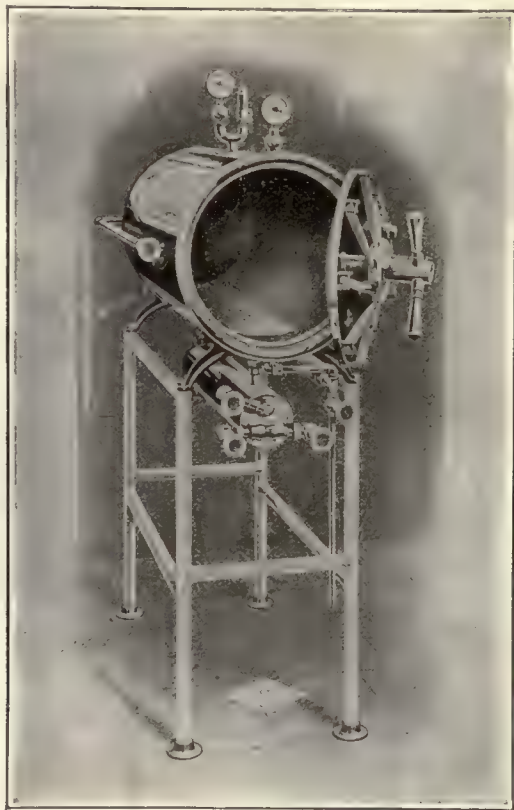


No. 404.

394. **RETORT, Tubulated**, for the distillation of creosote oil, according to the specifications of the American Society for Testing Materials. Capacity, about 250 cc; length of condenser tube, about 36 cm. (See Standard Method No. D38—17 for Sampling and Analysis of Creosote Oil) \$0.90
- THERMOMETER** for No. 394, see No. 350.
395. **CONDENSER, Glass**, for use with No. 394. Length, about 25 cm.75
396. **SHIELD, Galvanized Iron Covered with Asbestos**, for use with No. 394, for protection from air currents and for preventing radiation. 1.50
397. **SLIDE BOX, Barrett Type**, of copper with six corrugations for slide test of pitch. 6.00
398. **SPECIFIC GRAVITY PAN, American Society for Testing Materials Type**, of nickel, for determining the specific gravity of solid and semi-solid fractions of creosote oil. Diameter of top, 2.5 cm; depth, 1.2 cm. With hook for attaching to balance. 1.00
- VISCOSIMETER, Engler's**, see Oil Testing Apparatus.
400. **VISCOSIMETER, New York Testing Laboratory Type**, for the viscosity of bituminous binders at 90°F. Consists of a concave aluminum float 6 inches in diameter, and a brass collar which screws into the base of the float. Complete with three standardized brass collars. (See Engineers' Record for May 1, 1909). 8.50
401. **PLATE, Brass, 5 x 8 cm**, for use in filling the brass collar of No. 400.40
402. **VISCOSITY APPARATUS (Penetrometer), Schutte Type**, for Tarvia X and soft pitch, as used by the Barrett Manufacturing Company. Consists of a tube of brass 2 x 10 1/4 inches, with wire handle for suspending. A hollow plug of brass, 1 inch long with 5/8 inch bore, screws into opening in lower end. Complete with circular disk of tin plate for retaining pitch while plug is being filled. 6.00
403. **PLUG** only of No. 402, of brass. 1.60
- For **THERMOMETERS, HYDROMETERS, DRYING OVENS, WATER BATHS, DISTILLING FLASKS**, etc., see proper general headings.
- ATOM MODELS**, see Models.
404. **AUGER BITS**, set of 13 high grade bits in hardwood case; 1/4 to 1 inch by sixteenths of an inch. 6.30
405. **AUGER BITS**, good quality.
Size, 16ths of an inch.. 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Each58 .48 .48 .48 .48 .48 .58 .58 .68 .68 .78 .78 .90 .90
406. **AUGER BIT, Clark's adjustable expansion bit**, cutting from 1/2 inch to 1 1/2 inches. 1.00



Nos. 408-411.



Nos. 412-5.

AUTOCLAVES

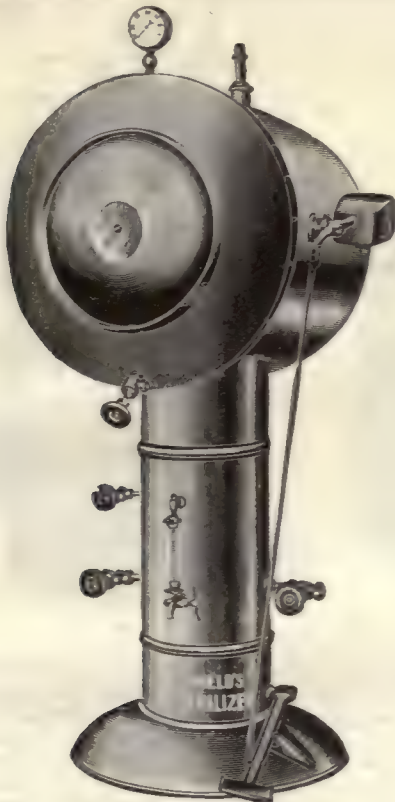
AUTOCLAVES, Steam Pressure Sterilizers, horizontal form, for rapid sterilization. Constructed of heavy polished copper with double wall. Mounted on substantial iron stand which can be permanently fastened to the floor. Below the sterilizer is a detachable steam generator which eliminates any danger of burning out the sterilizer should the water be entirely used up. The autoclave may be ordered without generator by those who possess a source of steam free from impurities. The circular door, made of solid cast brass, is quickly and easily opened, rolling back on a track inside the sterilizer. The door and head are perfectly ground and fitted, requiring no packing or gaskets to make a steam tight joint. No clamps or springs are required to hold the door shut, as it cannot be opened if the least steam pressure remains in the chamber, thus eliminating the danger of scalding. The steam enters, circulates around the inner jacket and is then admitted to the inner chamber through an automatic valve, the air being expelled through an air cock. The safety valve is set to relieve at 15 pounds pressure. The autoclave may be used as a free steam sterilizer by leaving the air cock open, thus insuring a temperature of 100°C. inside the inner chamber. Complete with inner shelf, water gage, safety valve, steam gage and generator.

No.	0B	1B	2B	3B	4B
Length inside, inches.....	16	20	24	28	28
Diameter inside, inches.....	12	16	20	22	25
Diameter of door, inches.....	8	10	12	14	16
408A. Without generator, burnished copper finish.....	\$121.25	143.75	175.00	225.00	308.00
408B. Same as above, with nickel-plated finish.....	130.25	155.00	190.00	245.00	333.00
409A. Arranged for gas heat, burnished copper finish ...	146.25	168.75	200.00	250.00	333.00
409B. Same as above, with nickel-plated finish.....	155.25	180.00	215.00	270.00	358.00
410A. Arranged for electric heat, burnished copper finish	171.25	193.75	225.00	275.00	358.00
410B. Same as above, with nickel-plated finish.....	180.25	205.00	240.00	295.00	383.00
411A. Arranged for oil heat, burnished copper finish ...	146.25	168.75	200.00	250.00	333.00
411B. Same as above, with nickel-plated finish.....	155.25	180.00	215.00	270.00	358.00

In ordering for electric heat, kindly state voltage and kind of current.

Note:—Crating will be charged extra at manufacturer's cost.

AUTOCLAVES, Horizontal Type, of double cylinder form with steam space entirely surrounding the inner chamber except at entrance door, thus reducing condensing surface to a minimum. By this arrangement the inner chamber becomes perfectly dry within a brief time after withdrawal of steam. A special control valve at the side with dial and indicator, permits the operator to regulate easily the admission or withdrawal of the steam or air from the inner chamber. The independent generator can be easily taken apart for cleansing and repairs. The autoclave is constructed of copper and brass, except the door, which is of



No. 416.



No. 420.

AUTOCLAVES, Horizontal Type, Continued.

bronze, deeply concaved for strength. The two walls of the steam chamber are of seamless drawn copper and brass, the inner lined with pure block tin. Around the outer is a heavy outside jacket to prevent radiation of heat and condensation of steam between the walls. The instrument is mounted on a white enameled tubular steel stand. Complete with steam generator, water gage, safety valve, air valve, pressure gage for steam jacket, vacuum and pressure gage for inner chamber, and necessary valves marked for use.

No.	A	B	C	D	E
Length, inches.....	19	20	22	24	28
Diameter, inches.....	9	12	14	16	20
412. Arranged for steam heat.....	\$270.00	333.00	414.00	477.00	612.00
413. Arranged for gas heat.....	270.00	333.00	414.00	477.00	612.00
414. Arranged for oil heat.....	283.50	346.50	427.50	502.20	649.80
415. Arranged for electric heat.....	310.00	374.00	470.00	520.00	657.00

AUTOCLAVES, Foot Power, improved model with door controlled by a foot pedal, a patented feature of this instrument. Foot pressure on the pedal closes the door and locks it in place steam tight instantly, leaving both hands free and eliminating any possibility of scalding. The steam generator is enclosed in the copper pedestal base, which is lined with asbestos, insulating and confining the heat, so that steam is generated with great rapidity. This design also makes the autoclave more economical as well as more convenient to operate. All supply pipes are brought up from the floor inside of the base, making a neat, compact installation. Constructed of cold rolled copper and bronze steam metal castings, nickel-plated throughout. Complete with steam and return water supply, gas and safety valves, air cocks, steam, temperature and water gages.

No.	A	B	C	D	E
Length, inches.....	20	24	28	28	30
Diameter, inches.....	17	20	23	26	28
Diameter of door, inches.....	10	12	14	16	18
416. Arranged for gas heat.....	180.00	216.00	306.00	405.00	450.00
417. Arranged for oil heat.....	195.00	238.50	336.00	450.00	510.00
418. Arranged for electric heat.....	202.50	247.50	345.00	457.50	525.00
419. Arranged for steam heat.....	180.00	216.00	306.00	405.00	450.00

In ordering for electric heat, kindly state voltage and kind of current.

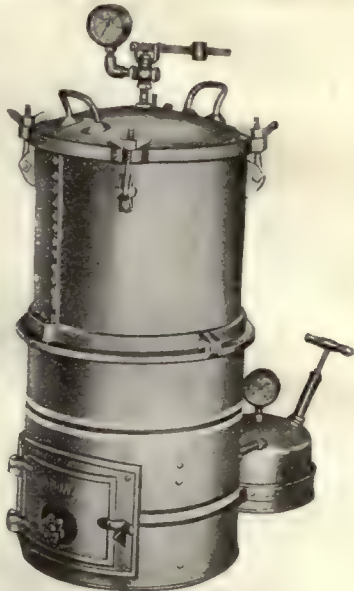
420. AUTOCLAVES, High Pressure, for sterilization or digestion under high steam pressure; widely used for vulcanizing in dental laboratories. Consists of a wrought iron pot with heavy cast iron cover accurately fitted to make a steam tight joint, and held in place by stud bolts projecting through the flange. Tested to stand a pressure of 60 atmospheres or about 900



No. 421.



No. 422.



No. 426.

AUTOCLAVES, High Pressure, Continued.

pounds. The safety apparatus is an effectual safeguard against explosions. Complete with gas heater, thermometer, wrenches, manifold with blow-off valve and safety apparatus.

No.	A	B	C
Diameter inside, inches.....	6	8	10
Depth inside, inches.....	8	11	11
Each	\$60.00	67.00	80.00

421. **GAS REGULATOR** for Autoclaves No. 420, designed to screw into manifold. Easily attached. By means of this device the gas flow is automatically controlled to maintain any desired temperature or pressure. Provided with special attachment for keeping burner lighted when gas flow is reduced to low pressure..... 19.25

422. **AUTOCLAVES, Pressure Cookers**, of cast aluminum, very useful for sterilization or digestion under pressure. Extensively used in domestic science laboratories for cooking under pressure. Can be used over any laboratory burner. Complete with pressure gage reading to 30 pounds, safety valve, petcock, and attachment for thermometer.

No.	A	B	C
Diameter at top, inches.....	8	9½	10½
Greatest diameter, inches.....	10	11½	12¾
Depth, inches.....	10	12	14
Capacity, quarts.....	10	17	25
Weight, pounds.....	8½	14½	21
Shipping weight, pounds.....	11	19	28
Each	19.00	25.00	31.00

AUTOCLAVES, Pressure Sterilizers, single wall, made of steel boiler plate, riveted and calked at the seams, with heavy flange. The cover is of semi-steel with sanitary packing and thumb screw clamps to hold firmly in place, and is provided with handles. The equipment includes polished copper grate tinned inside to hold articles to be sterilized, platform for grate, safety valve, steam gage, steam circulating device, thumb-nut wrench, and cover lifting device (on two larger sizes). Finished in aluminum bronze. When ordered without burner or coil, adjustable support stand will be furnished.

No.	A	B	C
Tested for pressure, pounds.....	30	50	50
Height of retort, inches.....	18	18	27
Diameter, inches.....	12	18	25
Height over all, inches.....	39½	40½	53
Width over all, inches.....	26	30	40
Sterilizing capacity, cubic inches.....	1350	2475	7620
Shipping weight, pounds.....	130	235	440
Size of crate, inches.....	11½x13	14x15	21x22

- | | | | | |
|------|------------------------------------|-------|-------|--------|
| 424. | Without gas burner or coil | 50.00 | 65.00 | 125.00 |
| 425. | With gas burner..... | 60.00 | 85.00 | 145.00 |
| 426. | With gasoline burner..... | 60.00 | 85.00 | 145.00 |
| 427. | With steam coil..... | 60.00 | 85.00 | 145.00 |
| 428. | With coil and gas burner..... | 65.00 | 90.00 | 150.00 |
| 429. | With coil and gasoline burner..... | 65.00 | 90.00 | 150.00 |



Nos. 432-438.



Nos. 440-442.

AUTOCLAVES, Vertical Type, with riveted boiler, made of heavy polished copper, tin lined, with seamless bottom. Provided with perforated tray with two shelves. The lid is made of cast brass, nickel-plated, and ground perfectly to fit flange which is provided with six thumb screw clamps to hold lid firmly in place. The instrument is guaranteed for a pressure of 35 pounds. The safety valve is set at 30 pounds but may be adjusted to suit operator. A petcock is supplied which must be kept open until the steam escapes, thereby forcing all the air out of the boiler. With base of sheet iron 8 inches high. Dimensions inside: diameter, 11 inches; height, 24 inches. Height over all, 44 inches. Complete with pressure gage, thermometer, safety valve and heating arrangement as listed below.

No.	Style	A copper with removable lid.	B copper with hinged lid.	C nickel-plated with hinged lid.
432.	Arranged for gas heat.....	\$ 90.00	96.00	100.00
433.	Arranged for oil heat.....	94.00	100.00	114.00
434.	Arranged for electric heat.....	134.00	140.00	145.00

In ordering for electric heat, kindly state voltage and kind of current.

AUTOCLAVES, same as No. 432 but larger, with 10 screw clamps and hinged lid. Inside dimensions: diameter, 14 inches; height, 26 inches. Height over all, 46 inches. Complete with heating arrangement as listed below.

No.	Finish	A copper	B nickel-plated
436.	Arranged for gas heat.....	117.00	121.00
437.	Arranged for oil heat.....	121.00	125.00
438.	Arranged for electric heat.....	170.00	175.00

In ordering for electric heat, kindly state voltage and kind of current.

BURNER, Quadruple Gas, for No. 432, see **Burner, Quadruple**, No. 2056.

BURNER, Gas, Low Form, extra large for No. 436, see **Burner, Gas**, No. 2108.

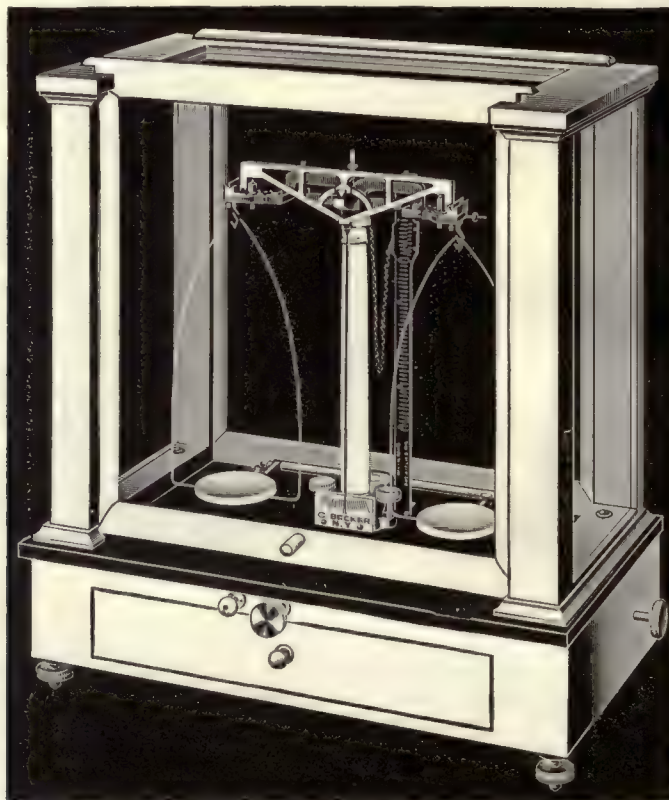
BURNER, Oil, for No. 437, see **Burner, Oil Stove**, No. 2220.

AUTOCLAVES, Vertical Type, with seamless boiler, made of drawn copper, highly polished and lacquered. The cover is of cast brass, nickered, is ground on the bevel to fit inside flange of boiler, which is provided with thumb screws to clamp lid firmly in place. Provided with rack for supporting articles to be sterilized. The autoclave is guaranteed to stand a pressure of 50 pounds. Complete with thermometer, pressure gage registering to 30 pounds, safety valve, escape valve for air and steam, sheet iron base 8 inches high, and an asbestos mat.

No.	A	B	C
Height inside, inches.	12	24	26
Diameter inside, inches.	8	11	13
440. Arranged for gas heat.	75.00	95.00	118.00
441. Arranged for oil heat.	79.00	99.00	126.00
442. Arranged for electric heat.	125.00	145.00	178.00

For **STERILIZERS** of other types, see general heading **Sterilizers**.

BACTERIOLOGICAL APPARATUS, see special headings, **Autoclaves, Incubators, Sterilizers, etc.**



No. 450.

BALANCES, ANALYTICAL, CHAIN

In the chain analytical balances is presented an entirely new feature of balance construction. The old rider arrangement is done away with entirely, and the finer weighings are obtained by changing the length of a small gold chain attached at one end to the beam of the balance, and at the other to a vernier which slides on a graduated vertical column. The vernier is operated by a spiral drive controlled from a milled head on the outside of the case. By this means all weighings from 1/10th milligram to 50 milligrams can be made without opening the case or using the beam arrest. In this way the rapidity and accuracy of weighing is greatly increased, as there are no small weights to handle and count and no rider to move back and forth. We estimate that 75 per cent of the time used in making a weighing is saved by this new method.

The balances themselves are of the finest construction, with large agate planes, finely ground knife edges, and separate pan arrest. The base is covered with a heavy black glass plate.

450. BALANCE, Analytical Chain, Christian Becker No. 8-A.

Capacity	200 grams.	Length of beam.....	7 inches.
Sensitiveness	1/20 milligram.	Bearings	agate planes.
Diameter of pans.....	2 1/2 inches.	Knife edges	agate.

Independent arrest for pans with automatic stop.

Width of pan support 4 inches; wider if specified.

Polished mahogany and glass case, glass top, front sliding frame counterpoised.

Dimensions of case: 16 1/4 inches long; 9 inches wide; 18 1/2 inches high. Specific gravity support and holder for weighing test tubes, with counterpoise, furnished.

Price, with Chain Vernier attachment, mounted on black plate glass base.....\$175.00

452. BALANCE, Analytical Chain, Christian Becker No. 15.

Capacity	100 grams.	Length of beam.....	6 inches.
Sensitiveness	1/20 milligram.	Bearings	agate.
Diameter of pans.....	3 inches.	Knife edges	agate.

Independent arrest for pans with automatic stop.

Width of pan support 4 inches; wider if specified.

Polished mahogany and glass case, glass top, front sliding frame counterpoised.

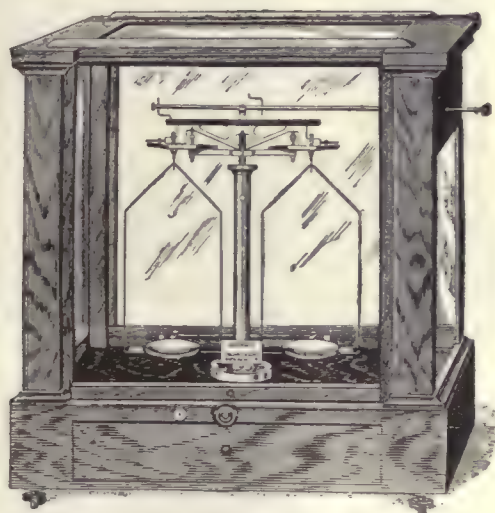
Dimensions of case: 16 1/4 inches long; 9 inches wide; 18 1/2 inches high.

Price, with Chain Vernier attachment, mounted on black plate glass base..... 130.00

BALANCES, ANALYTICAL, VOLAND



No. 454.



No. 458.

The balances listed below present certain new features in their construction, which should commend their use in rapid yet precise chemical weighing. They are of simple construction, easily adjusted, and with small danger of shifting sensibility since they are supported from a single point on a broad central agate plane. The releasing mechanism is of the fallaway type, controlled by an eccentric shaft turned by the milled head in the front. The red graduation of the index plate and the white graduation of the black beam facilitate rapid, accurate readings. The short beam provides short periods of oscillation. The patented rider arrangement makes it possible to work on either side of the zero line and prevents the rider from slipping back on the shank of the hook. All bearings are of agate. All cases are of mahogany finely finished, and provided with glass on all sides, admitting light freely to all parts. The front door is counterpoised and slides freely. The list below includes types from which one may select a balance for any kind of technical or analytical work.

454. BALANCE, Analytical.**Distinctive Features:—**

Beam of hard bronze.
 Beam graduated in 100 divisions on each side of zero.
 Two vial levels in plain sight from front.
 Rear door can be raised or removed.
 Base completely covered with heavy black plate glass and fitted with large drawer for weights.
 Patented rider arrangement provided with starter for swinging beam, operated from without case.
 Knife edges relieved from contact with bearings when not in use.
 Pan arrest separate from release; can be locked.

Specifications:—

Dimensions of case.....	16½ x 19 x 9½ inches.	Capacity	200 grams.
Length of beam.....	7 inches.	Sensibility	1/20th milligram.
Diameter of pans.....	2½ inches.	Weight of rider.....	10 milligrams.
Width of bows.....	4 inches.		

Equipment Furnished:—

One pair 3 inch watch glasses.
 Three 10-milligram riders.
 Wood bench for specific gravity work.

Price \$140 00

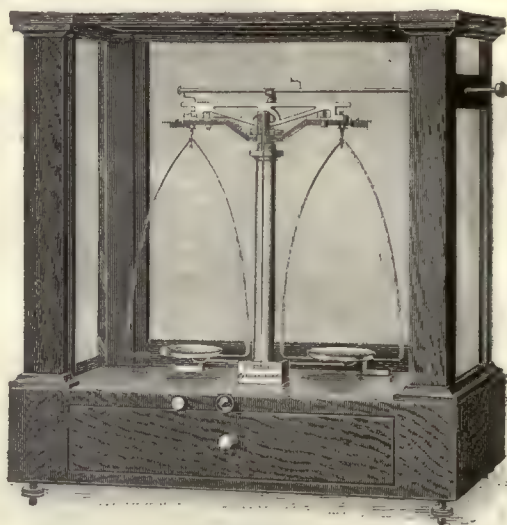
456. BALANCE, Analytical. Same as No. 454, but with metal parts heavily gold-plated. 150.00

458. BALANCE, Analytical. Similar to No. 454, but of simpler construction. Beam of aluminum, 6 inches long, graduated in 50 divisions on each side of zero. Base of wood, with drawer. Dimensions of case, 16½x19x9½ inches high. Sensibility, 1/10 mg; capacity, 200 grams.
Furnished with one pair 3 inch watch glasses, two 5 mg riders, and a wood bench for specific gravity work 85.00

460. BALANCE, Analytical. Same as No. 458, but with heavy black plate glass base over the mahogany base 93.00



No. 462.



No. 470.

462. **BALANCE, Analytical**, a rapid short arm balance of moderate price especially suitable for industrial work. Widely used in flour milling and baking laboratories.

Distinctive features:—

Short beam of hard-rolled aluminum.
 Beam graduated in 50 divisions each side of center.
 Spirit level in rear of base of column.
 Rear door can be raised or removed for weighing pipettes, etc.
 Large drawer for weights.
 Patented rider arrangement.
 Separate pan arrest, stopper of which can be locked.

Specifications:—

Dimensions of case... $16\frac{1}{2} \times 19 \times 9\frac{1}{2}$ inches.
 Length of beam.....6 inches.
 Diameter of pans..... $2\frac{1}{2}$ inches.
 Width of bows..... $4\frac{1}{2}$ inches.

Capacity100 grams.
 Sensibility $\frac{1}{10}$ th milligram.
 Weight of rider.....5 milligrams.

Equipment furnished:—

One pair 3-inch watch glasses.
 Two 5-milligram riders.
 Wood bench for specific gravity work.

Price \$75.00

464. **BALANCE, Analytical**. Same as No. 462, but with all metal parts heavily gold plated... 85.00

466. **BALANCE, Analytical**. Same as No. 462, but with heavy black plate glass base over the mahogany base 85.00

468. **BALANCE, Analytical**. Same as No. 466, but with all metal parts heavily gold plated... 95.00

470. **BALANCE, Analytical**.

Distinctive features:—

Short beam of hard-rolled aluminum.
 Beam graduated in 50 divisions on each side of center.
 Large drawer in base for weights.
 Patented rider arrangement.
 Knife edges relieved from contact with bearings when not in use.
 Separate pan arrest, stopper of which can be locked.
 Time of complete oscillation 12 seconds.

Specifications:—

Dimensions of case... $16\frac{1}{2} \times 19 \times 9\frac{1}{2}$ inches.
 Length of beam.....6 inches.
 Diameter of pans..... $2\frac{1}{2}$ inches.
 Width of bows..... $4\frac{1}{2}$ inches.

Capacity100 grams.
 Sensibility $\frac{1}{20}$ th milligram.
 Weight of rider.....5 milligrams.

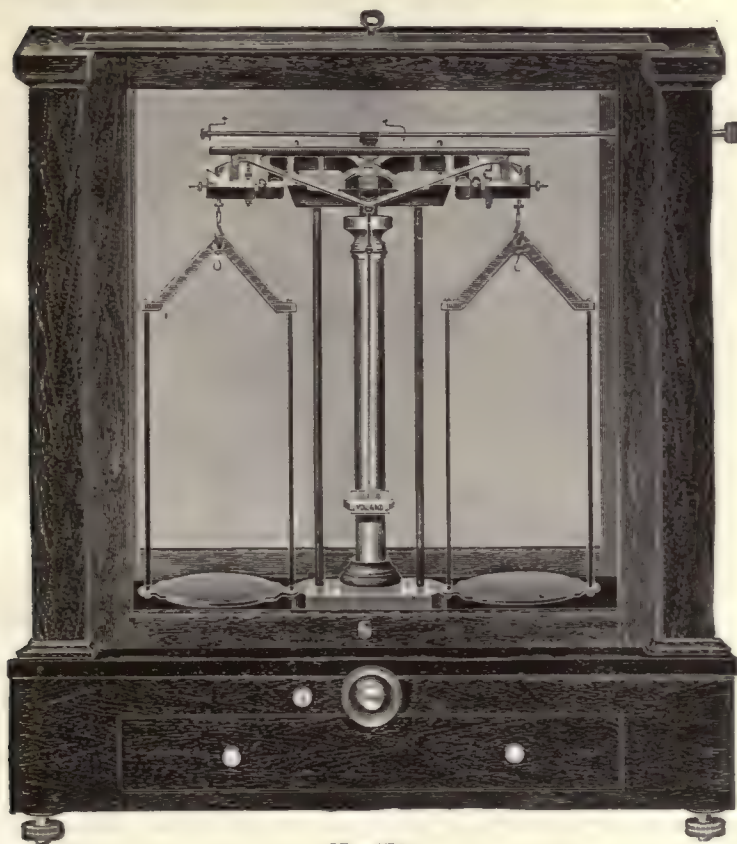
Equipment furnished:—

One pair 3-inch watch glasses.
 Two 5-milligram riders.
 Wood bench for specific gravity work.
 Weighing tube stand and counterpoise.

Price 90.00

472. **BALANCE, Analytical**. Same as No. 470, but with heavy black plate glass base over the mahogany base 98.00

474. **BALANCE, Analytical**. Same as No. 472, but with capacity 200 grams, and sensibility $\frac{1}{20}$ mg. 105.00



No. 476.

476. **BALANCE**, Analytical, large capacity. Suitable for calibration work.

Distinctive features:—

Long beam of hard-rolled alloy.
 Beam graduated in 100 divisions on each side of zero.
 Rear door can be raised or removed.
 Large drawer for weights.
 Wide pans and high bows.
 Patented rider arrangement.
 Separate pan arrest which can be locked.
 Large capacity.

Specifications:—

Dimensions of case.....	26 x 27 x 15 inches.	Height of bows.....	13 1/4 inches.
Length of beam.....	12 inches.	Capacity	1000 grams.
Diameter of pans.....	5 inches.	Sensibility	1/10 milligram.
Width of bows.....	6 inches.	Weight of rider.....	10 milligrams.

Price \$210.00

- | | | |
|-----------------------------------|--|--------|
| 478. BALANCE , Analytical. | Same as No. 476, but with heavy black plate glass over the mahogany base | 230.00 |
| 480. BALANCE , Analytical. | Same as No. 478, but with metal parts heavily gold plated..... | 260.00 |
| 482. BALANCE , Analytical. | Same as No. 478, but with capacity of 2,000 grams..... | 265.00 |
| 484. BALANCE , Analytical. | Same as No. 482, but with metal parts heavily gold plated..... | 295.00 |

SUMMARY AND COMPARISON OF SPECIFI

Balance	Capacity	Sensibility	Kind of beam and length in inches	Kind of case	Type of release
450	200 gm	1/20 mg	Bronze 7	Polished mahogany	Separate pan and beam
452	100 gm	1/20 mg	Aluminum 6	Polished mahogany	Separate pan and beam
454	200 gm	1/20 mg	Bronze 7	Polished mahogany	Separate pan and beam
456	200 gm	1/20 mg	Bronze 7	Polished mahogany	Separate pan and beam
458	200 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
460	200 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
462	100 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
464	100 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
466	100 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
468	100 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
470	100 gm	1/20 mg	Aluminum 6	Polished mahogany	Separate pan and beam
472	100 gm	1/20 mg	Aluminum 6	Polished mahogany	Separate pan and beam
474	200 gm	1/20 mg	Aluminum 6	Polished mahogany	Separate pan and beam
476	1000 gm	1/10 mg	Aluminum alloy, 12	Polished mahogany	Separate pan and beam
478	1000 gm	1/10 mg	Aluminum alloy, 12	Polished mahogany	Separate pan and beam
480	1000 gm	1/10 mg	Aluminum alloy, 12	Polished mahogany	Separate pan and beam
482	2000 gm	1/10 mg	Aluminum alloy, 12	Polished mahogany	Separate pan and beam
484	2000 gm	1/10 mg	Aluminum alloy, 12	Polished mahogany	Separate pan and beam
486	200 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam
488	200 gm	1/10 mg	Aluminum 6	Polished mahogany	Separate pan and beam

CATIONS OF ANALYTICAL BALANCES

Graduation of beam	Kind of base	Distinctive features	Price
Not graduated	Black glass with drawer	Chain attachment. Large capacity. Rapidity.	\$175.00
Not graduated	Black glass with drawer	Chain attachment. Rapidity.	130.00
Both sides 10 mg in 1/10th	Black glass with drawer	Patented rider arrangement. Red graduation of index plate.	140.00
Both sides 10 mg in 1/10th	Black glass with drawer	Same as above with gold-plated parts.	150.00
Both sides 5 mg in 1/10th	Wood with drawer	Simple construction. Large capacity.	85.00
Both sides 5 mg in 1/10th	Black glass with drawer	Same as above with plate glass base.	93.00
Both sides 5 mg in 1/10th	Wood with drawer	No arrest for end knife edges. Grooved agates.	75.00
Both sides 5 mg in 1/10th	Wood with drawer	Same as above with parts gold-plated.	85.00
Both sides 5 mg in 1/10th	Black glass with drawer	No arrest for end knives. Plate glass base. Grooved agates.	85.00
Both sides 5 mg in 1/10th	Black glass with drawer	Same as above with parts gold-plated.	95.00
Both sides 5 mg in 1/10th	Wood with drawer	Knife edges free from contact when at rest. High sensibility.	90.00
Both sides 5 mg in 1/10th	Black glass with drawer	Same as above with plate glass base.	98.00
Both sides 5 mg in 1/10th	Black glass with drawer	As above with larger capacity.	105.00
Both sides 10 mg in 1/10th	Wood base with drawer	Large capacity. Long beam. Large case.	210.00
Both sides 10 mg in 1/10th	Black glass with drawer	Same as above with plate glass base.	230.00
Both sides 10 mg in 1/10th	Black glass with drawer	Same as above with parts gold-plated.	260.00
Both sides 10 mg in 1/10th	Black glass with drawer	Very large capacity. Large case.	265.00
Both sides 10 mg in 1/10th	Black glass with drawer	Same as above with parts gold-plated.	295.00
One side 10 mg in 1/5th	Wood No drawer	Small case. No drawer. Low price.	42.50
One side 10 mg in 1/5th	Black glass No drawer	Same as above with plate glass base.	50.00

CENCO ANALYTICAL BALANCE



No. 486.

BALANCE, Cenco Analytical, designed to meet the needs of educational and commercial laboratories for an economical analytical balance.

Made specially for us by Voland & Sons, one of the largest and best known balance makers in America, it has all of the special features which have made their balances distinctive. The entire cost of the balance is in essentials, as the balance has been simplified and the cost of construction reduced to the lowest possible figure by means of automatic processes and machinery. We believe that a comparison of this balance with those of other makes, either American or foreign, will show it to be superior to any balance now obtainable for the same amount.

Specifications:—

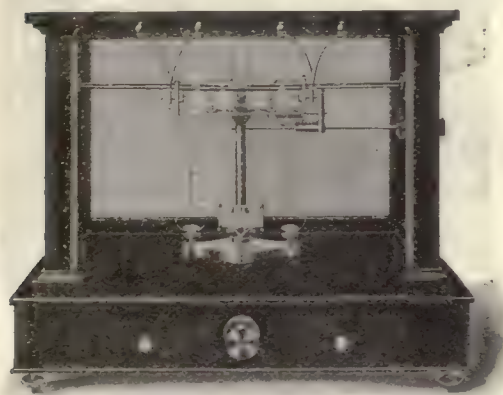
Beam	polished aluminum.	Capacity	200 grams.
Length of beam.....	6 in. graduated in 1/5th mg	Sensibility	1/10 mg.
Divisions of beam.....	50 to right of center.	Knife edges and bearings.....	agate.
Size of case.....	16 1/2 x 17 x 9 1/4 inches.	Weight of rider.....	10 mg.

Distinctive features:—

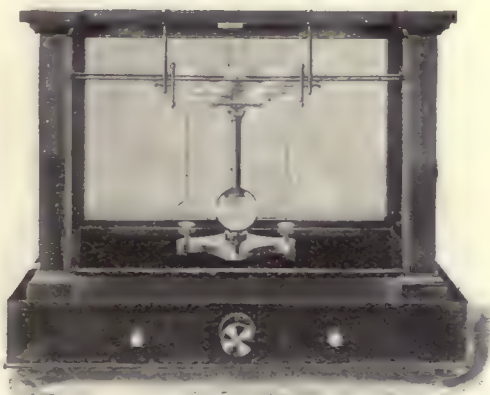
- Knife edges free from contact when balance is at rest.
- Independent arrests for beam, stirrups and pans.
- Fenders at end of stirrup supports to check extreme swing of beam and prevent jarring or sliding of stirrups on knife edges.
- High sensibility and rapidity of swing.
- Graduations of beam white on black background.
- Index plate graduated in red.
- No steel in construction of balance and hence no corrosion.
- Case of fine polished mahogany with counterpoised front door and glass on all sides
- Simple rider construction with patented rider hook.

486. **BALANCE, Cenco Analytical**, with wooden case and leveling screws.....\$42.50
488. **BALANCE, Cenco Analytical**, same as No. 486, but with black plate glass base..... 50.00

BALANCES, ASSAY



No. 490.



No. 492.

490. **BALANCE, Assay, Ainsworth Type C with Improved Multiple Rider Carriage.** Type C Balance is designed for particularly accurate work, such as control and umpire assays. The Multiple Rider attachment further adapts it for rapidity in making a large number of analyses, as in assay offices, smelters and mills. By means of this attachment, buttons up to 42 milligrams can be weighed without opening the case. As the riders are handled automatically, they preserve their shape and accuracy. Each rider has an individual arm, cannot be misplaced, and can be operated while the beam is in motion. The numbers on the arms which have been lowered, indicate the weight of the riders on the beam, and when through weighing, all riders are reset simultaneously by a reverse movement of the thumb piece. The beam is made of special alloy, of truss form, unobstructed at the top so that the rider can be placed at any point. Provided with improved star wheel adjustment and cylindrically ground glasses for reading divisions.

Distinctive features:—

- Multiple rider carriage.
- Highest degree of accuracy.
- Rapidity in weighing.

Specifications:—

- Length of beam, 12.7 cm graduated in 50 divisions each side of center.
- Sensibility, 1/500 milligram, reduced to 1/200 milligram for rapidity.
- Period of vibration, 7 seconds.
- Capacity of rider carriage, 42 mg.
- Pan rests of fallaway type.
- Skeleton hangers of German silver.
- Metal parts gold plated.
- Bearings of agate.
- Plate glass sub-base.
- Case 20 x 17 x 10 inches of seasoned mahogany, dust proof, with counterpoised door and drawers.

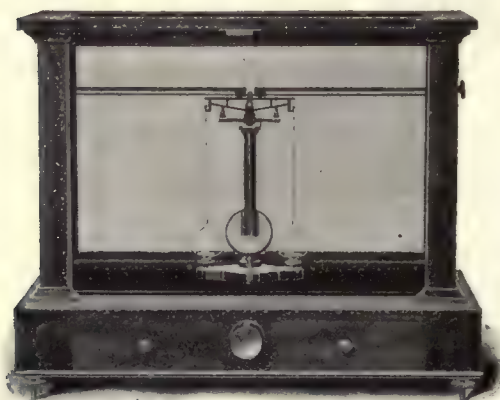
Price \$335.00

492. **BALANCE, Assay, Ainsworth Type A,** for rapid and accurate weighings, where a large volume of work is handled.

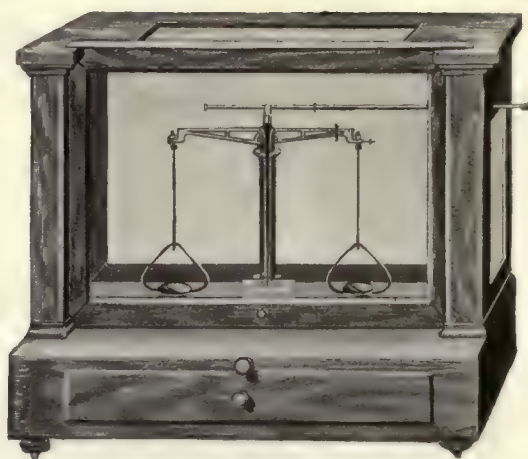
Specifications:—

- Beam of brass, 12.7 cm in length, graduated in 50 divisions each side of center.
- Sensibility, 1/200 milligram.
- Period of vibration, 7 seconds.
- Pan and beam arrest of fallaway type.
- Skeleton hangers of nickel silver.
- Metal parts lacquered.
- Bearings of agate.
- Plate glass sub-base.
- Case 20 x 17 x 10 inches, of seasoned mahogany, dust proof, with counterpoised door and drawers.
- Reading glasses for beam and index, the index glass of specially ground cylindrical form.

Price 250.00



No. 494.



No. 496.

494. **BALANCE, Assay, Ainsworth Type EA**, a moderate priced, short arm Balance of quick action with a sensibility of 1/100 milligram.

Specifications:—

Beam of heavy alloy, 12.7 cm in length, graduated in 50 divisions each side of center.
Sensibility, 1/100 milligram.
Period of vibration, 5 seconds.
Pan and beam arrest of fallaway type.
Skeleton hangers of nickel silver.

Metal parts lacquered.

Bearings of agate.

Plate glass sub-base.

Case 20x17x10 inches, of polished mahogany, dust proof, with counterpoised door and drawers.

Reading glass for index.

Price \$160.00

496. **BALANCE, Assay, Voland**, as used for carbon weighing in steel analysis.

Specifications:—

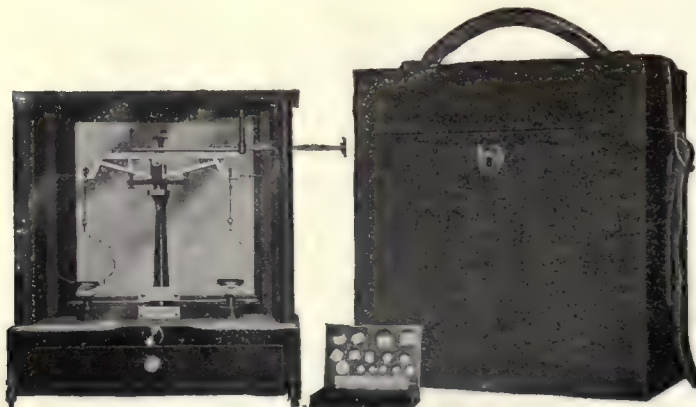
Beam of aluminum alloy, 6 inches long, subdivided in 50 divisions on right side of center.
Capacity, 25 grams.
Sensibility, 1/100 milligram.
Skeleton hangers of German silver.
Period of vibration, 10 seconds.

Metal parts lacquered.

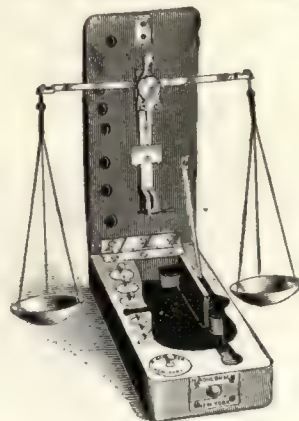
Knife edges of accurately ground knife steel and bearings of agate.

Case 15x13x8 inches of seasoned mahogany, with counterpoised door and drawer.

Price 75.00



No. 498.



No. 500.

498. **BALANCE, Assay, Troemner's Portable No. 132**, with carrying case of walnut, provided with lock and key, trunk strap and handle. Size of carrying case, 8½ x 9½ x 5 inches. Total weight of outfit 6¼ pounds.

Specifications:—

Beam of aluminum alloy, 10 cm in length, graduated in 50 divisions each side of center, fitted with locking device to hold beam rigid when carrying.
Sensibility 1/100 milligram.
Pan and beam arrest of fallaway type.

Skeleton hangers of nickel silver with aluminum pans

Metal parts lacquered.

Bearings of agate.

Case 7½ x 8¼ x 2½ inches, of polished mahogany, with counterpoised door and drawer.

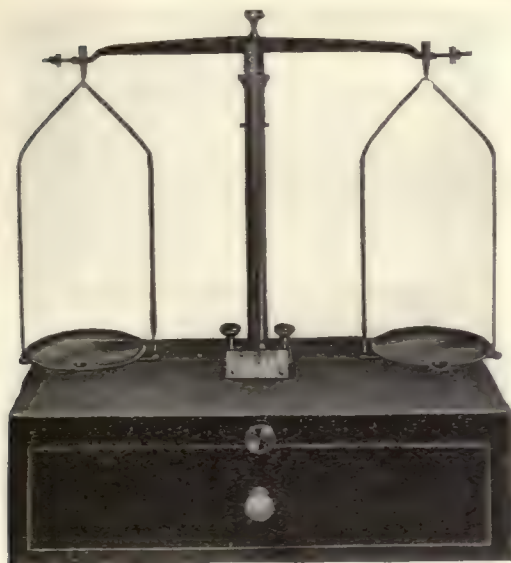
Complete with set of accurately adjusted platinum weights from 1 gram to 1/10 milligram, and riders 91.00

500. **BALANCE, Assay, Pocket**, for use in traveling.

Improved form with eccentric lift for beam. When closed measures 6 x 2¼ x 1½ inches. Capacity, 10 grams; sensibility, ¼ milligram.

Complete in case with set of weights from 10 grams to 1 milligram..... 18.00

BALANCES, PULP



No. 502A.



No. 504.

502. **BALANCES, Pulp**, mounted on polished mahogany box with drawer into which the whole balance may be packed away. Provided with leveling screws (except No. 502A) fitted with steel bearings, adjusting screws on end of beam, and weight pans with handles.

Number	Capacity	Sensibility	Diameter of pans	Beam length	Price
			mm	mm	
A.	60 gm or 2 oz.	1 mg	75	150	\$13.00
B.	60 gm or 2 oz.	1 mg	75	150	17.00
C.	150 gm or 5 oz.	2 mg	88	200	22.25
D.	300 gm or 10 oz.	5 mg	100	225	31.50
E.	600 gm or 20 oz.	5 mg	125	275	38.00
F.	1500 gm or 50 oz.	10 mg	150	300	40.50

504. **BALANCES, Pulp**, similar in construction to the above, but with agate bearings. Provided with beam and end hanger supports which relieve the knife edges from contact with the bearings when the beam is at rest, thus protecting the knife edges and preserving the sensibility. Fitted with leveling screws and level.

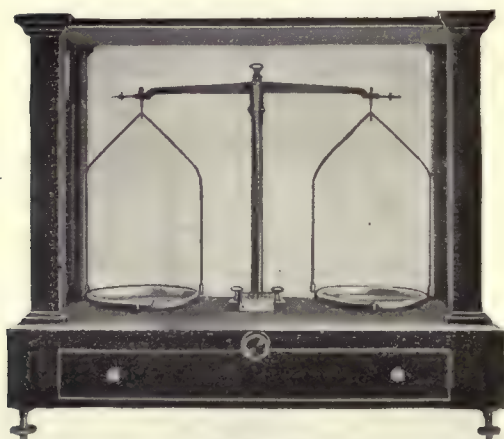


No. 506.

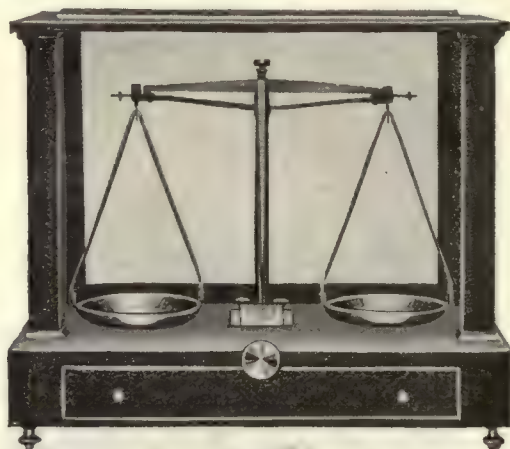
Number	Capacity	Sensibility	Diameter of pans	Beam length	Price
A.	60 gm or 2 oz.	1 mg	75	150	24.75
B.	150 gm or 5 oz.	1 mg	88	200	34.00

506. **BALANCE, Pulp**, similar to above but mounted on mahogany box with white marble top. Beam is divided into nine equal parts on each side of the center, enabling a rider to be used instead of small fractional weights. A high grade pulp balance for those who prefer one without a case. It is especially valuable for moisture determinations, for weighing pulp and sugar, and for solution work. Bearings of agate. Capacity, 60 gm or 2 oz.; sensibility, 1 mg; diameter of pans, 75 mm; beam length, 150 mm..... 27.50

BALANCES, PULP, IN CASE



No. 508.



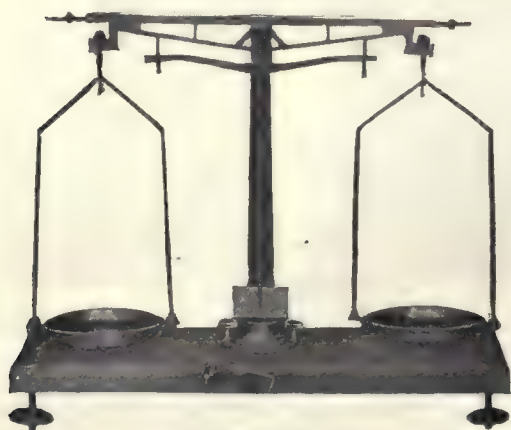
No. 510.

508. **BALANCES, Pulp**, in polished mahogany case with counterpoised sliding front door and drawer for weights. Beam provided with adjusting screws and steel bearings. Case mounted on leveling screws and fitted with level.

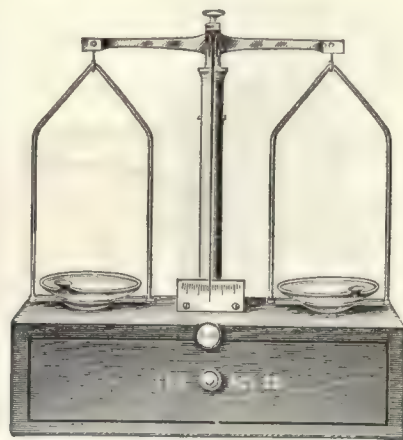
Number	Capacity	Sensibility	Diameter of pans mm	Beam length mm	Price
B.	60 gm or 2 oz.	1 mg	75	150	\$26.00
C.	150 gm or 5 oz.	2 mg	88	200	31.25
D.	300 gm or 10 oz.	5 mg	100	225	43.00
E.	600 gm or 20 oz.	5 mg	125	275	53.50
F.	1500 gm or 50 oz.	10 mg	150	300	66.50

510. **BALANCES, Pulp**, similar in construction to above, but provided with agate bearings and with arrest for beam and hangers. These balances are recommended for use where exposure to moisture or acid fumes would quickly destroy steel edges.

Number	Capacity	Sensibility	Diameter of pans mm	Beam length mm	Price
A.	60 gm or 2 oz.	1 mg	75	150	40.50
B.	150 gm or 5 oz.	1 mg	88	200	50.75



No. 512.



No. 514.

512. **BALANCE, General Laboratory**, made entirely of magnalium which offers a high degree of resistance to all laboratory fumes. It has the further advantage of being light and strong. The knife edges and bearings are of agate. The beam is graduated and notched to facilitate the use of rider. Provided with beam support and leveling screws. Capacity, 100 grams; sensibility, 2 mg; diameter of pans, 75 mm. 23.50

514. **BALANCE, Chemical**, with eccentric lift. Beam 150 mm long, pans 65 mm in diameter. Mounted on base with drawer. Sensibility, 1 centigram 10.00

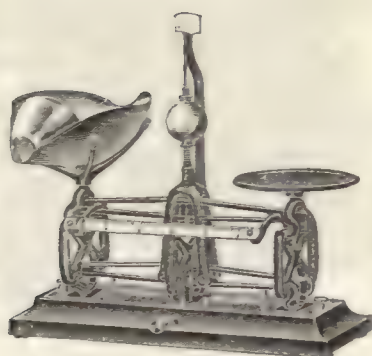
BALANCES, TORSION



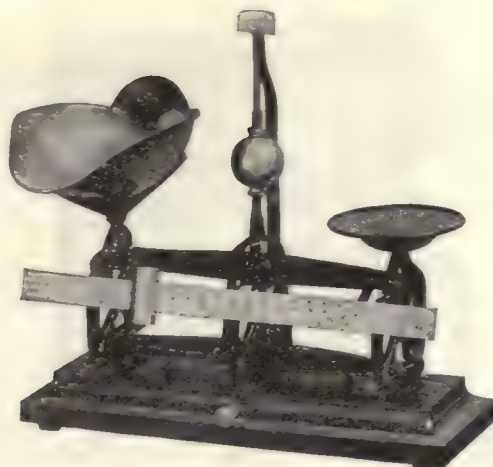
No. 516.



No. 518.



No. 520.

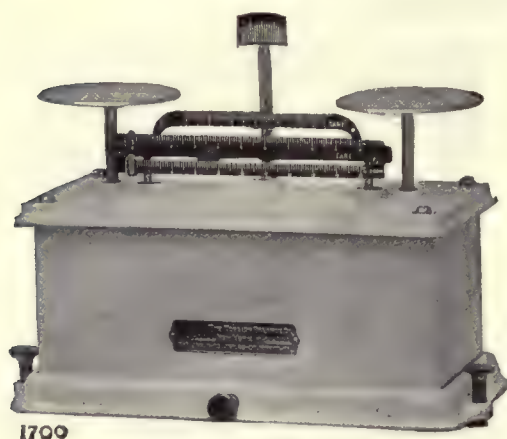


No. 522.

In the Torsion Balance the twisting of a steel band takes the place of the knife edge fulcrum, and this with its relatively short period of vibration makes the balance very rapid for accurate work.

Among those listed below will be found balances for practically every laboratory purpose except for the most precise analytical work.

516. **BALANCE, Torsion, Cream Test Balance.** Enclosed in white enamelled box with index and arrest, counterpoise beam with sliding weight inside operated from without. Object pan constructed especially for holding one milk or cream test bottle. Capacity, 1 bottle; sensibility, 8 milligrams. Complete with one 9 gram and one 18 gram weight. Dimensions, $10 \times 5\frac{1}{2} \times 9$ inches over all..... **\$20.00**
518. **BALANCE, Torsion, Cream Test Balance.** Same construction as above, but with each pan designed to hold two cream test bottles. Capacity, 4 bottles; sensibility, 8 milligrams. Complete with one 9 gram and one 18 gram weight **24.00**
520. **BALANCE, Torsion, Grain Test,** designed according to suggestions of the United States Department of Agriculture expressly for determination of moisture in grain, according to Bulletin No. 99, United States Bureau of Plant Industry. Slide beam, 9 inches in length, graduated to 10 grams by 1/10th; scoop, $10\frac{1}{2} \times 5\frac{1}{2} \times 2\frac{1}{2}$ inches with spout for pouring directly into flask; weight plate, 4 inches in diameter; capacity, 1 kilogram; sensibility, $6\frac{1}{2}$ centigrams. Complete with set of brass weights in block, from 5 grams to 100..... **24.00**
522. **BALANCE, Torsion, Grain Test,** designed especially for grading corn according to the requirements of the Federal Corn Grades. Same construction as No. 520, but with 9 inch beam graduated to furnish four simultaneous readings: 100% by $\frac{1}{2}\%$, 200 grams by 2 grams, $8\frac{3}{4}$ ounces by $\frac{1}{8}$ ounce, and 70 pounds per bushel by 1 pound. These graduations render the balance useful in grain laboratories for a great variety of purposes, such as moisture determinations; percentage of dirt, cracked and broken grains; bushel weight, etc..... **27.00**



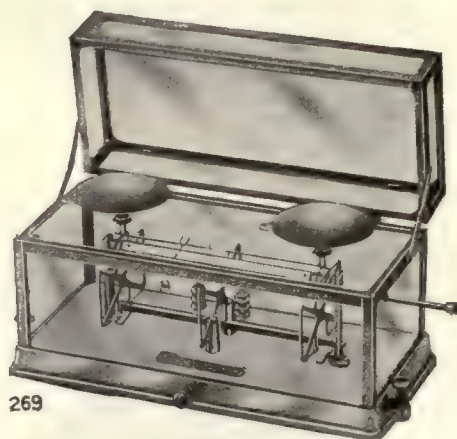
No. 524.



No. 526.



No. 528.

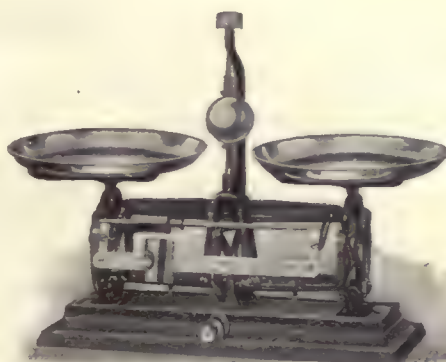


No. 530.

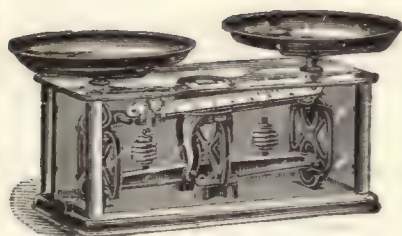
524. **BALANCE, Torsion, Moisture.** Enclosed in white enamelled case with leveling screws and index; four beams with sliding weights; two upper beams graduated for tare or counterpoise; lower beams graduated to 10% by 1/10th, and 20% by 2/10ths, so that from 1/10th of 1 per cent to 30% of moisture in 10 gram samples can be determined without calculation. Especially valuable for moisture in butter. Pans, 3 inches in diameter, of brass nickel plated; capacity, 120 grams; sensibility, 13 milligrams. Dimensions, 10 x 5½ x 9½ inches over all..... \$20.00
526. **BALANCE, Torsion, Moisture,** for determining moisture by evaporation from coal, grain, etc. Fitted with scoop 10½ x 5½ x 2½ inches with spout for rapid pour out. Weight plate, 4 inches in diameter; slide beam, 12 inches in length graduated on upper side to 1 pound by 1/10th ounce; on lower side to 100% by 1%. Capacity, 2 pounds; sensibility, 5 grains..... 34.00
528. **BALANCE, Torsion, Seed Testing,** designed especially for seed analysis and for acidity of corn, as described in Bulletin 102, United States Department of Agriculture. Enclosed in glass case with cover, metal parts nicked throughout. Object pan shaped to form scoop, 3½ x 2½ x 1½ inches; weight pan of German silver 3 inches in diameter. Beam inside case graduated to 500 milligrams by 5 milligrams. Capacity, 120 grams; sensibility, 2 milligrams. Dimensions, 13 x 6¼ x 6½ inches over all..... 52.00
530. **BALANCE, Torsion, Solution or Prescription,** in glass case with cover. Provided with slide beam graduated from 500 to 5 milligrams, with rider operated from outside of glass case. Pans of German silver 3 inches in diameter; capacity, 120 grams; sensibility, 2 milligrams. An excellent balance for use in making up volumetric solutions, or for prescription work. Dimensions, 13 x 6¼ x 6½ inches over all..... 45.00



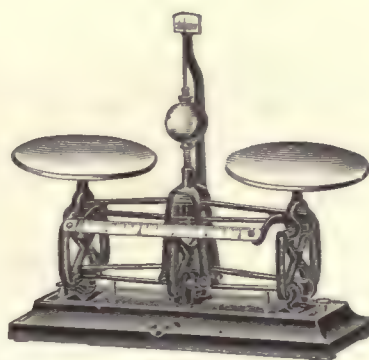
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No. 536.



No. 540.



No. 544.

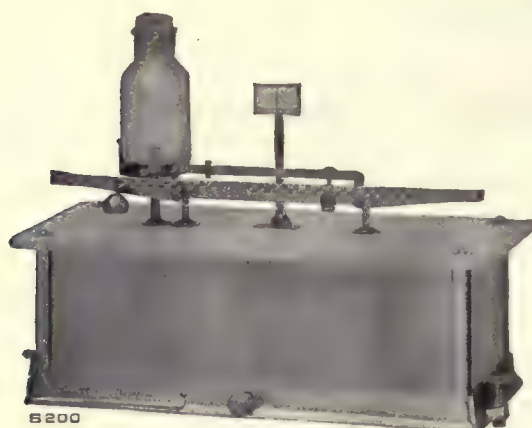
532. **BALANCE, Torsion, Solution**, with 9 inch nickeled brass pans and slide beam, and with high poise ball and index. Length of beam 12 inches, graduated to 450 grams by 5 grams; capacity of balance, $4\frac{1}{2}$ kilograms; sensibility, 15 centigrams **\$27.00**
534. **BALANCE, Torsion, Solution**, similar to No. 532, but with 9 inch beam, and 6 inch pans. Capacity, 2 kilograms; sensibility, $6\frac{1}{2}$ centigrams. Slide beam graduated to 100 grams by 1 gram. **25.00**
536. **BALANCE, Torsion, Solution**, same construction and specifications as No. 532, but with counterpoised beam. Bottles, casseroles or beakers may be tared by sliding weight on beam, facilitating weighing and eliminating errors. Capacity, $4\frac{1}{2}$ kilograms; sensibility, 25 centigrams **30.00**
538. **BALANCE, Torsion, Solution**, same construction and specifications as No. 534, but with counterpoised beam and tare weight as in No. 536. Capacity, 2 kilograms; sensibility, $12\frac{1}{2}$ centigrams. **28.00**
540. **BALANCE, Torsion, Solution**, in glass and metal case, nickel-plated throughout. Slide beam inside case graduated to 100 grams by 1 gram, with rider operated from outside. Nickeled brass pans 9 inches in diameter. Capacity of balance $4\frac{1}{2}$ kilograms; sensibility, 20 centigrams. Dimensions, $20\frac{1}{2} \times 9\frac{3}{4} \times 9\frac{1}{2}$ inches over all. **45.00**
542. **BALANCE, Torsion, Solution**, same construction as No. 540, except provided with poise ball and index, increasing the sensibility to $6\frac{1}{2}$ centigrams. Slide beam graduated to 10 grams by $1/10$ th. Dimensions, $19\frac{1}{2} \times 11\frac{3}{4} \times 8\frac{1}{2}$ inches over all. **60.00**
544. **BALANCE, Torsion, Soil**, with flat porcelain plates, 6 inches in diameter. Slide beam 9 inches in length, graduated to 10 grams by $1/10$ th. Capacity, 1 kilogram; sensibility, $6\frac{1}{2}$ centigrams. High poise ball and index. **26.00**

SUMMARY AND COMPARISON OF SPECIFI

Balance	Capacity	Sensibility	Beam Length inches	Kind and size of pans
516	1 bottle	8 mg	Beam enclosed in case	Bottle holder and small weight pan
518	4 bottles	8 mg	Beam enclosed in case	Each pan shaped to hold two bottles
520	1 kilo	6½ cg	9	1 scoop 10½ x 5½ x 2½ in. Weight pan iron, 4 in.
522	1 kilo	6½ cg	9	1 scoop 10½ x 5½ x 2½ in. Weight pan iron, 4 in.
524	120 grams	13 mg	4 of different lengths	Brass nickeled 3 in.
526	2 lbs.	5 grains	12	Scoop 10½ x 5½ x 2½ in. Weight pan iron, 4 in.
528	120 grams	2 mg	Beam enclosed in case	Object pan scoop 3½ x 2½ x 1½ in. Weight pan German silver, 3 in.
530	120 grams	2 mg	Beam enclosed in case	German silver, 3 in.
532	4½ kilos	15 cg	12	Nickeled brass, 9 in.
534	2 kilos	6½ cg	9	Nickeled brass, 6 in.
536	4½ kilos	25 cg	12	Nickeled brass, 9 in.
538	2 kilos	12½ cg	9	Nickeled brass, 6 in.
540	4½ kilos	20 cg	Beam enclosed in case	Nickeled brass, 9 in.
542	4½ kilos	6½ cg	Beam enclosed in case	Nickeled brass, 8 in.
544	1 kilo	6½ cg	0	Porcelain flat, 6 in.
546	100cc bottle	2 mg	About 10	Object pan for holding bottle. No weight pan.

CATIONS OF TORSION BALANCES

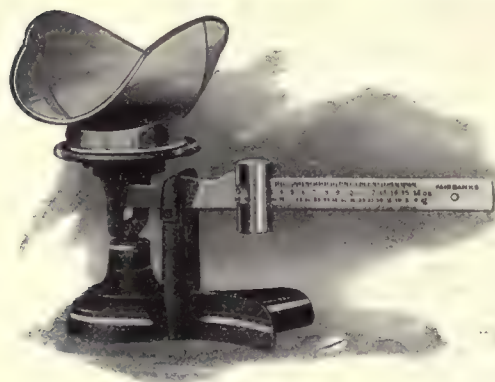
Kind of graduation	Case	Special features	Recommended use	Price
Not graduated, used only for counterpoise	White enameled box	Designed especially for cream testing	Cream testing	\$20.00
Not graduated, used only for counterpoise	White enameled box	Designed especially for cream testing	Cream testing	24.00
10 gm to 1/10 gm	Not enclosed	Scoop pan, set of weights included	Moisture in corn and other grain	24.00
100% x 1½%, 200 gm x 2 gm, 8¾ oz. x ½ oz., 70 lb. to bu. x 1 lb.	Not enclosed	Graduation for grain testing	Corn and wheat grading	27.00
Upper two beams for tare, lower two to 10 and 20% by 1/10th	White enameled box	Beams for tare and percentage	Moisture and butter testing	20.00
Upper side 1 lb. by 1/10th oz., lower 100% to 1%	Not enclosed	Percentage and decimal graduation	Moisture in coal and grain	34.00
500 mg by 5 mg	Glass with cover	High sensibility and scoop pan	Seed analysis and acidity in corn	52.00
500 mg to 5 mg	Glass with cover	High sensibility and protection of parts	Solution or prescription	45.00
450 gms to 5 gms	Not enclosed	Large capacity with fair sensibility	General laboratory use	27.00
100 gms to 1 gm	Not enclosed	Large capacity with fair sensibility	General laboratory use	25.00
450 gms to 5 gms	Not enclosed	Counterpoise for tare	Solution and moisture	30.00
100 gms to 1 gm	Not enclosed	Counterpoise for tare	Solution and moisture	28.00
100 gms to 1 gm	Glass case No cover	Large capacity and protection of parts	Dispensing or solution	45.00
10 gm to 1/10 gm	Glass case No cover	Large capacity, protection and high sensibility	Dispensing, prescription and grain testing	60.00
10 gm to 1/10 gm	Not enclosed	Rapidity and high sensibility	Soil analysis and general use	28.00
Specific gravity upper beam .01x.0001; lower 1.4 to .70x.01	Metal and ground glass	Specific gravity graduation. No loose weights	Specific gravity of liquids	55.00



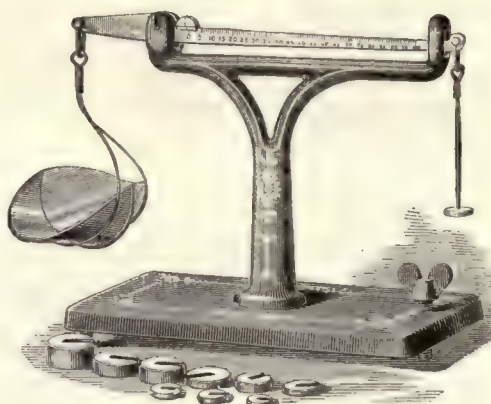
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No. 550.



No. 552.



No. 553A.

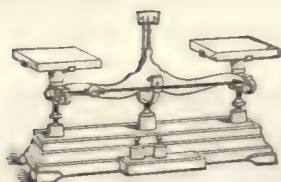
546. **BALANCE, Torsion, Specific Gravity**, enclosed in ground glass and metal case with leveling screws and index. Operates entirely by counterpoise and slide beams, no weight pan or loose weights being necessary. Object pan shaped to hold glass bottle. Slide beam graduated upper part to .01 by .0001, lower part 1.40 to .70 by .01, enabling specific gravities to be read directly to the fourth place. Complete with glass bottle holding 100cc. Sensibility, 2 milligrams. \$55.00

BALANCES, MISCELLANEOUS

548. **BALANCE, Automatic**, with weighing chart having a range of 500 grams by 5 gram divisions. Accurate reading is made possible by the hair line pointer provided. Agate bearings and hardened steel pivots throughout, with oil dash pot for regulating the sensibility of the balance. Equipped with a round glass plate and finished in blue enamel. Each 5 gram division is 1.635 mm wide. 50.00
550. **BALANCE, Automatic**, same as No. 548, but with chart having a range of 1500 grams by 5 gram divisions. Each division is .68 mm wide. 55.00
552. **BALANCE, Cement Scale**, for determining percentage of fineness of cement. Beam graduated on upper side to 16 ounces by $\frac{1}{4}$ ounce, lower side to 100% by 1%. Should be used in connection with our No. 12124 sieves. Can also be used for dirt in seed, moisture in grain, ores, etc. Complete with brass scoop. 12.00
- 553A. **BALANCE, Cement Scale**, for fineness of cement. Capacity 1 pound by 1/10,000 pound divisions. 12.50
- 553B. **BALANCE, Cement**, same as No. 553A, but with beam graduated to weigh to 500 grams by 1/100 gram divisions. 12.50



No. 554.



No. 556.



No. 560.



No. 562.

554. **BALANCE, Counter or Dispensing**, in ebony box with marble top and nickel-plated pans.

No.	0	1	2
Capacity, lbs	5	8	10
Diameter of pans, inches.....	7	8	9
Sensibility, grains	20	20	20
Each	18.25	21.00	23.50

556. **BALANCE, Cream Test**, for use in connection with Babcock Test. Especially designed for very accurate weighing of cream. Metal parts galvanized to make them rust-proof; porcelain plates 3 x 3 inches, and agate bearings. The bar in front of the balance is used for balancing bottle and is provided with the necessary weight. This scale is compact, being but 10½ inches long, and being of careful construction is accurate. Complete with one each 9 and 18 gram weights. Capacity, one bottle; sensibility, 100 mg. **\$14.50**

560. **BALANCE, Cream, Wisconsin Hydrostatic**. This balance has been devised to meet the demand for a simple and correct method of weighing cream into test bottles and consists of a specially devised brass float, which is placed in a cylinder of water. Very accurate weighings can be made with this instrument, and as there are no bearings to rust it will retain its sensitiveness indefinitely. Complete with metal cylinder, float and 9 gram weight, but without bottle.. **5.50**

562. **BALANCE, Decimal Milk**. This spring scale is intended especially for use in connection with the Babcock Test for keeping records of the quantity of milk from individual cows, together with the percentage of fat, so as to calculate the butter yield. The scale is provided with a loose pointer, which by means of a thumb screw may be set anywhere on the dial to offset the weight of the milk pail. The readings being in pounds and decimals of pounds makes the calculation very much simpler than when pounds and ounces are given as on the ordinary scale. (Decimal divisions not shown in the illustration.) Capacity, 30 pounds, weighing by 1/20 pound

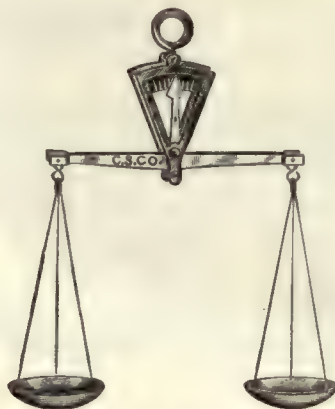
4.50

564. **BALANCE, Decimal Milk**. Same as No. 562, but with capacity of 60 pounds, weighing by 1/10 pound

4.50



No. 566.



No. 570.

566. **BALANCE, Family Scale, Standard**, with slanting white enameled dial; weighs 24 lbs. by 1 oz. divisions; with square sheet steel platform and tin scoop..... \$2.50
568. **BALANCE, Family Scale, Metric**. Same as No. 566, but for weighing 10 kilos by 50 gram divisions 3.00
570. **BALANCE, Hand**, improved design. Manufactured by us to replace the cheaply made European balances. The supporting stirrup is shaped at the top to form a **graduated index plate**, enabling the observer to tell more accurately when the beam is level; it also limits the motion of the beam, preventing the weights from being scattered by a sudden swing. Constructed of brass with 8 inch beam and 3 inch horn pans supported by cords. Weighs accurately to 1 centigram 3.00
572. **BALANCE, Laboratory**, designed for those desiring a more sensitive and convenient form of balance than the Harvard Trip scale.

Capacity, 2 kilos.

Sensibility. Loads up to 2 kilos can be readily weighed within 0.05 grams. Sensibility on light loads is much greater.

Beam, open construction. A rider upon beam indicates all amounts up to 10 grams by 1/10 gram divisions, each division being 2.54 mm long, making small weights unnecessary.

Damping Device, positive in action, brings balance quickly to rest.



No. 572.

Bearings, of high grade steel, carefully polished and adjusted.

Hangers of improved design, eliminating friction and wear.

Pan Arrest. The base serves as an arrest, enabling operator to move balance safely while loaded.

Leveling Screws are supplied, insuring greater sensitiveness.

Plumb Bob, not shown in illustration, makes accurate leveling a simple matter.

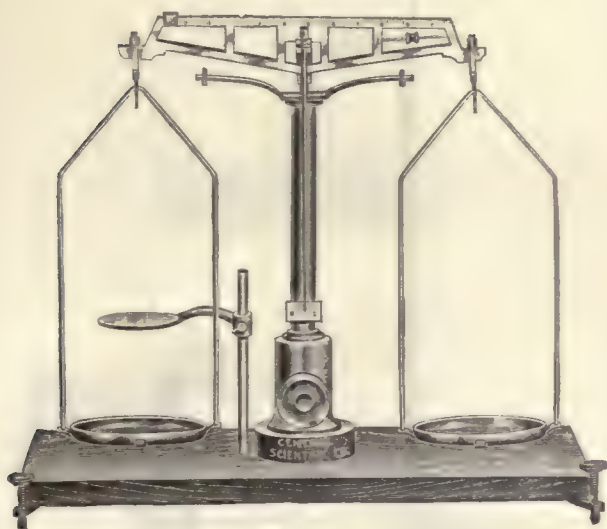
Adjusting Screw protected within open work of beam.

Dimensions. Length of beam between knife edges, 32 cm. Length of graduated part, 25.4 cm.

Pans, of aluminum 14 cm in diameter. Height of balance, 45 cm. Width of bows, 15 cm; height of bows, 35 cm. Pans, bows and stirrups accurately balanced, making them interchangeable.

An Adjustable Shelf for specific gravity work is included.

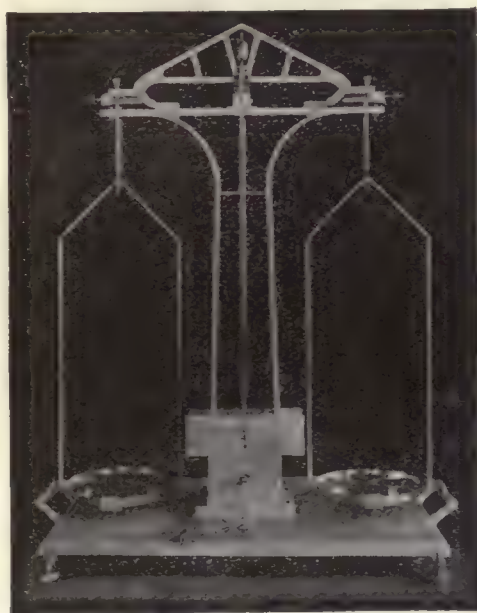
Price 15.00



No. 574.

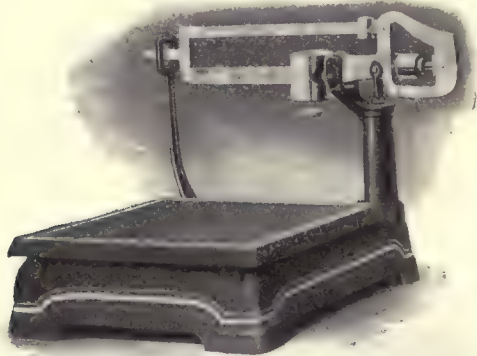


No. 578.



No. 576.

- 574. BALANCE, Laboratory**, similar to No. 572, but more sensitive and of better finish and construction. Mounted on polished, mahogany finished base provided with leveling screws. Sliding rider on graduated beam indicates weight up to 10 grams in 1/10 gram divisions. Prismatic steel bearings and supports. An eccentric movement operated by knurled head raises beam from beam arrest. Provided with shelf for specific gravity work. Made of brass finely finished; pans of aluminum. Plumb bob and protected adjusting screw as in No. 572. Height of balance, 48 cm; diameter of pans, 14 cm; length of beam (between knife edges), 32 cm. Capacity, 2,000 grams. Sensibility with full load, 30 milligrams or less, which is increased with smaller loads \$27.50
- 576. BALANCE, Lecture Table**, constructed entirely of magnalium and aluminum, making it very light and portable. Beam of magnalium 14 inches long. Knife edges and bearings of agate, relieved from contact when beam is at rest. Provided with two pointers, permitting readings to be made from front or rear. Scale on index plate 6 inches long, with divisions $\frac{1}{4}$ inch apart, easily read 30 feet away. Base of balance 20 inches long and 12 inches wide, with handles. Height over all, 24 inches; diameter of pans, 6 inches. Pointer deviates 2 inches for 150 milligram load..... 150.00
- 578. BALANCE, Moisture Scale**, for determining percentage of moisture or sulphur in ores, etc. Provided with 6 inch iron plates, with tin scoop 15 x 8 inches and counterpoise. Beam graduated on upper side to 1 pound by $\frac{1}{4}$ ounce and on lower side from 0 to 100% of one pound. Capacity, 4 pounds; sensibility, 1/16 ounce. Complete with set of weights from 2 lbs. down..... 13.00



No. 584.



No. 596.

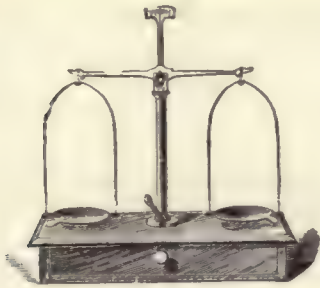


No. 588

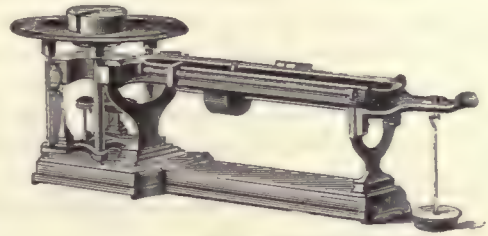


No. 580.

580. **BALANCE, Platform Scale**, with patented combination beam. Graduated on one side of beam to 500 pounds by $\frac{1}{2}$ pound divisions; on other side to 175 kilos by 100 gram divisions. No loose weights, as full capacity is on the beam. Mounted on wheels..... 70.00
584. **BALANCE, Platform, Express Package Scale**, with platform $10\frac{1}{2} \times 12$ inches, with double beam, lower bar graduated to 50 pounds by 5 pounds, upper to 5 pounds by 1 ounce. Finished in maroon, ornamented 24.00
586. **BALANCE, Platform, Express Package Scale**, as above, but with lower beam graduated to 20 kilograms by 1 kilo, upper to 2 kilograms by 20 grams..... 24.00
(Note: This graduation is made to order only, and we can not promise immediate delivery.)
588. **BALANCE, Platform, Automatic Scoop**. In the center of the platform is a depression into which the base of the scoop fits, automatically engaging the counterpoise, thus eliminating errors through removal of the scoop. Provided with reinforced, seamless brass scoop, $21\frac{3}{4} \times 10 \times 6$ inches, all brass parts heavily nicked. Finished in maroon. Platform 15×12 inches. Double beam of brass, lower bar graduated to 50 pounds by $\frac{1}{2}$ pound, upper bar to 15 pounds by 1 ounce. Rest of 250 pounds capacity can be obtained through counterpoise weights on weight hanger. An excellent balance for use in sampling coal, ore, cement, etc..... 52.00
590. **BALANCE, Platform, Automatic Scoop**, as above but with lower bar graduated to 20 kilograms by $\frac{2}{10}$ kilos, upper to 6 kilograms by 20 grams 52.00
(Note: This graduation is made to order only, and we can not promise immediate delivery.)
592. **BALANCE, Platform**, same as No. 588, but with solid platform without scoop and scoop balance attachment 44.00
594. **BALANCE, Platform**, same as No. 590, but with solid platform without scoop and scoop balance attachment 44.00
596. **BALANCE, Platform**, for obtaining personal height and weight. Constructed of metal throughout with tall pillar, placing beam on level with eye. Finished in white enamel with nicked beam, graduated to 5 pounds by 1 ounce. Rest of 250 pounds capacity on the counterpoise weights. Platform $10\frac{1}{2} \times 14\frac{1}{2}$ inches, with measuring rod. Complete with weights.... 48.00



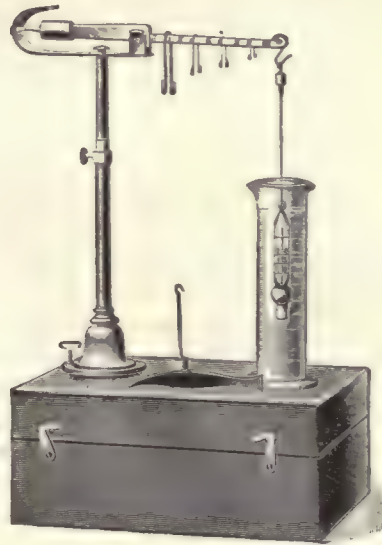
No. 604.



No. 606.



No. 608.



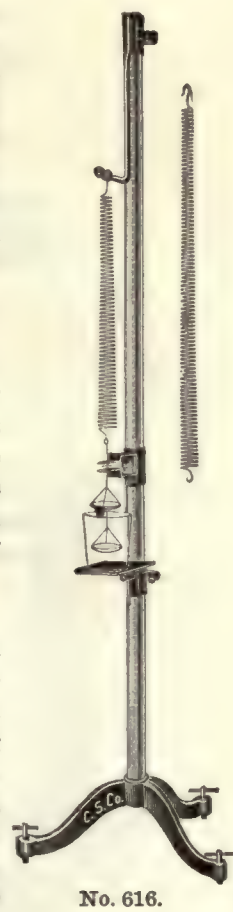
No. 610.

604. **BALANCE, Prescription (Army)**, nickel plated, mounted on a box with drawer with 6 inch beam lifted by a lever. Capacity, 50 grams..... \$4.00
606. **BALANCE, Solution**, provided with two weighing beams and sliding poises. One beam is divided into one hundred parts, each part representing one gram; the other beam is divided into ten parts, each part representing one hundred grams. A bar with sliding poise is placed under the weighing beams for the purpose of balancing the empty bottle or container, which is quickly done by sliding the poise along the bar until a correct balance is secured. This balance will be found indispensable in soil study where quantities up to 20 kilos need to be weighed with accuracy. Sensibility, 1 gram..... 32.50
608. **BALANCE, Specific Gravity, Hydrostatic**. Excellent for work in specific gravity experiments. Prismatic steel knife edges, adjustable rod supporting beam, and beam arrest. Beam can be so elevated that hook under short pan is 30 centimeters from the table. Mounted on neatly japanned iron base. Length of beam, 25 centimeters; diameter of pans, 10 centimeters; capacity, 200 grams; sensibility, 1 centigram..... 6.00
610. **BALANCE, Specific Gravity, Westphal Type**. This is a handy and improved form for exact and quick determination of the density of liquids. In polished hardwood box, with Reimann's thermometer sinker having displacement of 5 cc. This balance overcomes all trouble with incorrect hydrometers and forms an easy means for standardizing hydrometers. Complete with 5, 50, 500 milligram, and 5 gram riders, and 15 gram counterpoise 25.00
611. **THERMOMETER, Extra**, reading from 10° to 30°C., with displacement of 5 cc..... 6.00
612. **WEIGHTS, Extra**, for No. 610 Balance, per set, without counterpoise..... 3.00

616. **BALANCE, Specific Gravity, Jolly's Spiral Spring**, improved design. The upright is nickel-plated, 100 centimeters long, graduated in millimeters, and supported by a heavy japanned iron tripod base, fitted with leveling screws. The support for the spring is adjustable and can be inverted for light loads or heavier springs. As the upright rod is graduated for its full length this spring support may be set at any given point, and may be moved during an experiment provided the amount of its motion is added to or subtracted from the stretch of the spring. The indicator at the end of the spring may thus be kept at a convenient height during an entire experiment.

Attached to the sliding index is a small mirror with a horizontal line etched upon it, and a device for limiting the motion of the spring. The indicator attached to the end of the spring is a small metal disc which may be set very accurately in line with its own image and the etched line on the glass. The position of the index is then read directly from the scale. This method of reading embodies all the advantages of the mirror scale, and at the same time does away with the necessity of reading the position of the index while attempting to hold three objects in line with the eye.

The platform for holding the beaker of water or other liquid is of oxidized brass and slides on the upright, to which it can be clamped in any position. For experiments in cohesion or surface tension a device is provided by which the platform may be fastened to and moved with the sliding index. The lower pan is of glass suspended by fine platinum wires. The springs are of the best steel, conical in form, especially made for Jolly Balance work. Two springs, one high and one low tension, are supplied with the balance..... \$17.50



No. 616.

618. **BALANCE, Specific Gravity, Jolly's Spiral Spring**, made entirely of metal and nicely finished throughout. The upright is a nickel plated rod 100 cm long supported by a japanned iron tripod base. The platform is of oxidized brass which slides along the rod and can be clamped in any position. The spring support is also adjustable and can be inverted for light loads or heavier springs, allowing a larger range. An adjustable mirror scale 65 cm long, graduated in millimeters, is provided. The pans are of aluminum. Furnished complete with spring No. 628..... 5.50

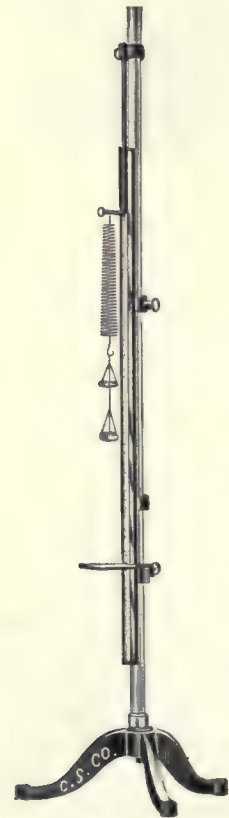
620. **SCALE PAN, for Jolly's Spiral Spring Balance.** Lower pan of aluminum, with copper wires..... .25

622. **SCALE PAN, for Jolly's Spiral Spring Balance.** Upper pan of aluminum, with copper wires..... .25

624. **SCALE PAN, for Jolly's Spiral Spring Balance.** Lower pan of glass, with platinum wires75

626. **SPRING for Jolly's Balance, light**..... .45

628. **SPRING for Jolly's Balance, heavy**..... .45



No. 618.

630. **BALANCE, Spring, English**, cylindrical pocket form, arranged to obviate the zero error. Reads to 15 lbs. in 4 oz. divisions. Spring elongates $2\frac{1}{4}$ inches..... \$0.70

632. **BALANCE, Spring, English**, 25 pounds in 8 ounce divisions. Spring elongates $1\frac{1}{2}$ inches.. .20

634. **BALANCE, Spring, English**, 50 lbs. in 1 lb. divisions. Spring elongates $1\frac{3}{4}$ inches.... .36

636. **BALANCE, Spring, English and Metric**, with flat back and broad pointer, for either perpendicular or horizontal reading. Reads to 8 oz. in $\frac{1}{4}$ oz. divisions, and 250 grams in 10 gram divisions. Spring elongates $2\frac{1}{4}$ inches.. 1.10

638. **BALANCE, Spring, English and Metric**, with flat back and broad pointer, for either perpendicular or horizontal reading. Reads to 64 oz. in 1 oz. divisions, and 2,000 grams in 25 gram divisions. Spring elongates $2\frac{1}{4}$ inches.60

640. **BALANCE, Spring, English and Metric**. Capacity, 18 oz. in $\frac{1}{5}$ oz. divisions and 500 grams in 10 gram divisions. Has flat back and sharp pointer, and is provided with several divisions above the zero to compensate for the sharp pointer in horizontal readings. Spring elongates to 4 inches..... 3.30



No. 630.

No. 636.

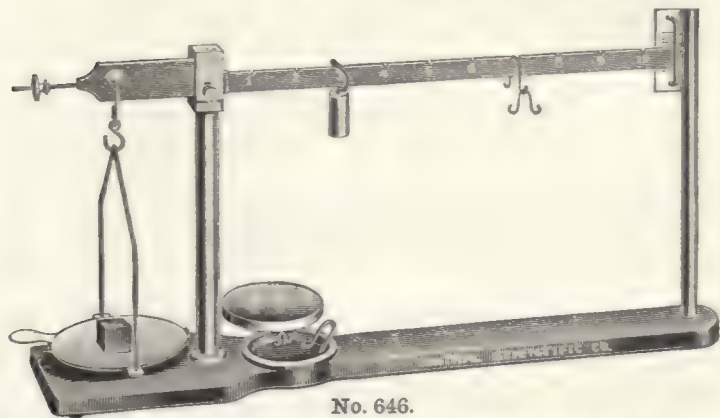
No. 638.

No. 640.

No. 644.

642. **BALANCE, Spring, English and Metric**, with flat back. Reads to 30 lbs. in $\frac{1}{4}$ lb. divisions, and 15 kilos in 100 gram divisions. Spring elongates $5\frac{1}{2}$ inches..... 2.30

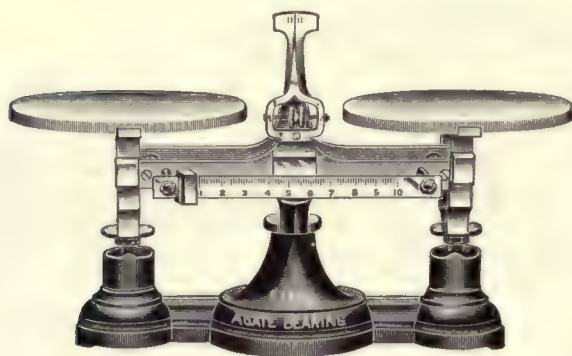
644. **BALANCE, Spring, English and Metric**, in iron case with sliding index recorder. Especially designed for experiments in tensile strength, the indicator remaining at the breaking strain, instead of going back to zero when the strain is released, as in the case of the regular spring balances. Reads to 30 lbs. in $\frac{1}{4}$ lb. divisions, and 15 kilos in 100 gram divisions. Spring elongates $5\frac{1}{2}$ inches..... 8.00



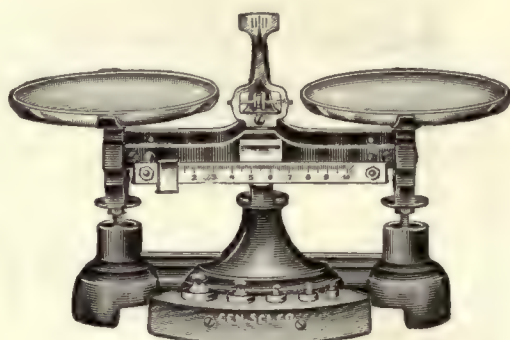
No. 646.

646. **BALANCE, Stoddard Laboratory**, designed by Prof. J. T. Stoddard, Department of Chemistry, Smith College, Northampton, Mass. Capacity 121 grams; sensibility, less than 1 cg. Especially suited for use in Elementary Chemistry, since it is much more accurate and easy to handle than the Horn Pan Balance, and more durable than the cheap equal arm Chemical Balance.

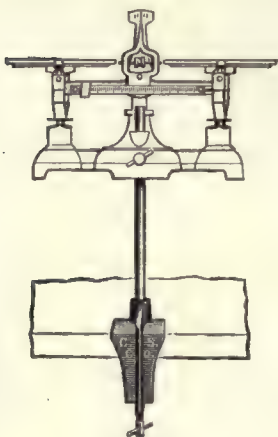
Five riders are furnished, which weigh 10 g., 1 g., 1 g., 0.1 g., and 0.01 g., respectively, when placed on the first notch on the beam. These values multiplied by the number of the notch give the weight required. For example, the balance in the illustration is in equilibrium with a mass of 37.7 grams in the pan. When not in use the riders are kept in a covered receptacle permanently attached to the base of the balance..... 7.50



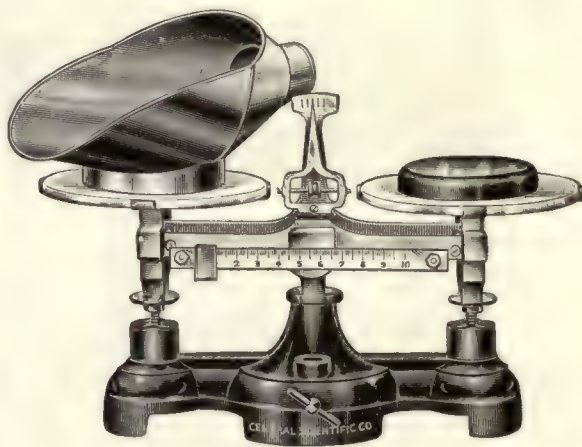
No. 648.



No. 652.



No. 650.



No. 654.

648. **BALANCE, Trip Scale, Cenco Agate Bearing, Harvard design.** In this trip scale we have done away with the rough cast and forged iron parts used for years in the Harvard Trip Scale, and employ parts of brass and steel neatly formed by elaborate tools and machinery. This makes possible a degree of perfection never before attained in assembling this style of balance. We have discontinued altogether the cheap imported balances of the Robervahl type, as we believe the superior accuracy and durability of the Cenco Trip far outweighs the slight difference in price. The BEARINGS consist of HARDENED STEEL PRISMS resting on SIX AGATE SHELVES of large dimensions. This construction adds very materially both to the initial sensibility of the scale and to its ability to retain its sensibility after long continued use. The graduated beam has a range of 10 grams in 1/10 gram divisions. The capacity of the scale is 2000 grams. Sensibility is guaranteed to be 1/10 gram. Actual tests show a much greater sensibility.

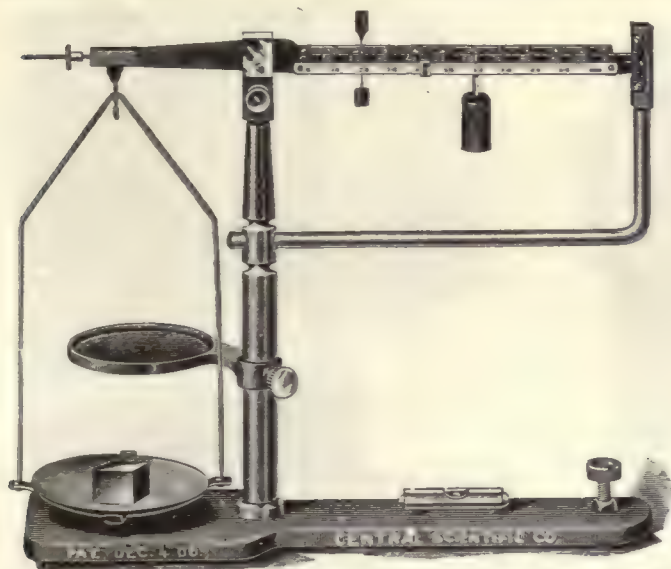
A very convenient feature of our latest design is a hook placed directly below the knife edges of each scale pan, from which objects may easily be suspended for specific gravity work. A set screw is also provided by means of which the balance may be clamped to a 13 mm support rod, and so elevated above the table top..... \$7.50

650. **SUPPORT, for No. 648 Trip Scale.** Consists of a table clamp of special design (No. F197), and a No. F133 Support Rod, 20 cm long. This forms a most convenient means of supporting No. 648 Trip Scale for specific gravity work, as the scale is provided with a set screw for clamping to a support rod, and with specially designed hooks for supporting specimens which are to be weighed under water 1.25

652. **BALANCE, Dispensing and Solution Scale, with Agate Bearings as described under No. 648.** This balance will be found ideal for laboratory and pharmaceutical work. The pans are of heavy nicked brass, 15 cm in diameter. The graduated beam has a range of 10 grams in 1/10 gram divisions, and brass weights from 10 grams to 100 grams are supplied, conveniently fitted into a projecting holder. Capacity, 2,000 grams. Sensibility is guaranteed to be 1/10 gram; actual tests show a much greater sensibility..... 10.00

654. **BALANCE, Grain Test.** Consists of No. 648 Cenco Agate Bearing Trip Scale with the addition of a funnel scoop and counterpoise, accurately adjusted 10.00

656. **FUNNEL SCOOP AND COUNTERPOISE, only, of No. 654.**..... 2.50



No. 658.



No. 700.

No. 702.

No. 706.

658. **BALANCE, Triple Beam, Cenco**, for physical and chemical laboratories. The three beams are placed in the same horizontal plane, thus conforming to scientific principles involved, which is not true of other styles of Triple Beam Balances. Weighings are obtained by movement of the riders along the beams. These riders are easily handled and quickly placed in the notches, but cannot be removed from the beams. An adjustable support is provided for a jar or other receptacle for experiments in specific gravity. Provided with stable base neatly japanned, and with sensitive spirit level and leveling screw. Balance neatly finished in nickel plate and japan. Capacity of middle beam, 100 grams by 10 gram divisions; back beam 10 grams by 1 gram divisions; front beam, 100 centigrams by 1 centigram divisions. Total capacity, 111 grams; sensibility, with or without full load, guaranteed to 1 centigram. Actual tests, however, give a sensibility of from 4 to 8 milligrams. Diameter of pan, 9.5 cm; width of bow, 10.5 cm; height of bow, 22 cm. Features easily recognized are: rapid weighing, constant sensibility, accuracy, freedom from loss of weights, no interference or breaking of weights... \$17.50
660. **WEIGHT, Extra**, for use with No. 658, for weighing over 111 grams, but not to exceed 201 grams. Weight is placed on the 100 gram notch of the middle beam. Sold only at the same time with No. 658..... 1.75

WEIGHTS, ANALYTICAL

700. **WEIGHTS, Analytical, Gold Plated, Highest Accuracy**, adjusted to meet the requirements of the United States Bureau of Standards, **Class M**. Useful for checking accuracy of other weights. Gram weights made of Tobin bronze, one piece heavily gold plated; fractions of gram of platinum with 3—10 mg riders. In polished mahogany velvet lined box with hinged covers. Furnished with United States Bureau of Standards Certificate.

No.	A	B
Size 1 mg to, grams.....	50	100
Per set.....	59.50	64.00

702. **WEIGHTS, Analytical**, adjusted within the tolerance of the United States Bureau of Standards for analytical work. All gram pieces are of brass, heavily gold plated. The fractionals from 500 mg to 50 mg are of Rhotanium A and from 20 mg to 1 mg of aluminum with 3—10 mg riders. In polished mahogany velvet lined box, with hinged cover, and with forceps. Each weight fitted in separate compartment.

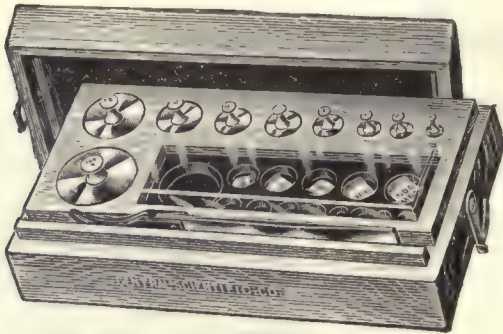
No.	A	B	C	D	E	F
Size 1 mg to, grams.....	20	50	100	200	500	1000
Per set.....	23.00	25.00	28.00	37.00	44.00	53.00

704. **WEIGHTS, Analytical**, same as No. 702, but furnished with United States Bureau of Standards Certificate.

No.	A	B
Size 1 mg to, grams.....	50	100
Per set.....	40.50	43.75

706. **WEIGHTS, Analytical**, same quality as No. 702, but carefully lacquered instead of gold plated.

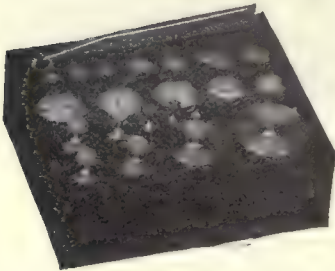
No.	A	B	C	D	E	F
Size 1 mg to, grams.....	20	50	100	200	500	1000
Per set.....	21.00	22.00	24.00	30.00	36.00	43.00



No. 708.



No. 716.



No. 718.



No. 720.



No. 710.

708. **WEIGHTS, Analytical, Precision**, for use with Nos. 450 and 452 Chain Balances. Of lacquered brass, with fractional weights from 500 mg to 50 mg of platinum. Adjusted to within the tolerance of Class S Bureau of Standards. In polished velvet lined mahogany box. Complete with forceps.

No.	A	B	C
Size 50 mg to, grams.....	20	50	100
Per set.....	\$22.00	23.00	25.00

710. **WEIGHTS, Analytical, Fractions of Grams**, of same quality as supplied in above sets. In polished wooden box with slip lid, with separate compartment for each weight. 1-2-5-10-20 mg pieces of aluminum; 50-100-200-500 mg pieces of Rhotanium A.....per set 19.00

Size, mg.....	Aluminum					Rhotanium A				
	1	2	5	10	20	50	100	200	500	1000
Each .....	.60	.60	.60	.60	1.00	1.50	2.00	3.00	4.50	8.00

WEIGHTS, Analytical. These weights are the same quality as No. 706, except the fractionals are of 22-carat solid gold, thus reducing the price due to the excessive cost of Rhotanium fractionals.

No.	A	B	C	D
Size 1 mg to, grams.....	10	20	50	100
Per set	14.00	15.50	18.00	21.00
Per set with Bureau of Standards Certificate			38.50	41.00

716. **WEIGHTS, Analytical, Fractions of Grams**, of 22-carat gold, as supplied with No. 714, in polished wooden box with slip lid, with separate compartment for each weight. Weights below 50 milligrams are of aluminum..... 9.00

Size, mg.....	Aluminum					Gold			
	1	2	5	10	20	50	100	200	500
Each .....	.45	.45	.45	.65	.65	.95	1.20	1.30	1.50

718. **WEIGHTS, Analytical**, designed for student use, accurately adjusted. Gram pieces of solid brass, polished and lacquered. No loose balancing material used as all adjustments are made on knob stem. Fractionals of aluminum, the box of natural mahogany with hinged lid, velvet lined, with separate compartment for each weight. A pair of brass forceps is supplied.

No.	A	B
Size 1 mg to, grams.....	50	100
Per set.....	10.50	11.75

No.	A	B
Size, 1 mg to, grams.....	50	100
Per set.....	9.25	10.50

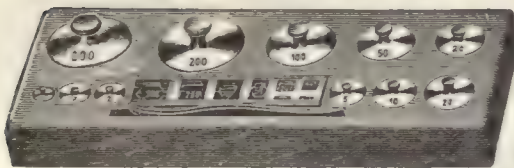
720. RIDERS, Analytical , of aluminum, very carefully adjusted.										
Size, mg.....	12	10	6	5	3	2	1.2	1	.6	.5
Each .....	.35	.35	.35	.35	.55	.55	.55	.55	.55	.65



No. 722.



No. 730.



No. 736.



No. 734.

721. **WEIGHTS, Assay or Button, of Platinum**, from 1 gram to 1 milligram with two riders; guaranteed accurate to 0.01 mg. Weights from 20 mg down are of aluminum. In hardwood box \$24.00

722. **WEIGHTS, Assay Ton**, of hard brass polished and lacquered, in mahogany box. These weights are accurately adjusted to a standard of 29.1666 grams equals one Assay Ton which therefore contains as many milligrams as there are troy ounces in an avoirdupois ton. Hence if one A. T. of ore assays one milligram, the ore runs one troy ounce to the ton.

No.	A	B	C
Size 1/20 A. T. to, A. T.....	1	2	4
Per set.....	\$6.50	8.00	9.00

724. **WEIGHTS, Assay Ton, single weights.**

Size, assay ton.....	1/20	1/10	2/10	5/10	1	2	4
Each	1.00	1.00	1.00	1.20	2.30	2.60	3.25

726. **WEIGHTS, Factor**, of brass lacquered, for the rapid analysis of iron and steel.

A. Carbon Factor.....	2.7273 grams	Each	1.30
B. 1/2 Carbon Factor.....	1.3636 grams	Each	1.30
C. 1/4 Silicon Factor.....	1.1755 grams	Each	1.30
D. Phosphorus Factor.....	1.63 grams	Each	1.30
E. 1/10 Silicon Factor.....	0.4702 grams (platinum)	Each	7.00

730. **WEIGHTS, Normal Sugar**, of brass, lacquered, in box.

No.	A	B
Set of.....	2	3
Consisting of, grams.....	13.024	13.024
	26.048	26.048
		52.096
Per set.....	5.20	6.50

732. **WEIGHTS, Normal Sugar, separate weights.**

Size, grams.....	13.024	26.048	52.096
Each	2.00	2.00	2.00

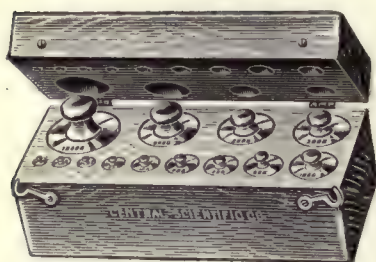
WEIGHTS of MEDIUM GRADE for LABORATORY and TECHNICAL WEIGHING

734. **WEIGHTS, Medium Grade, Metric**, gram pieces of solid brass, flat shape, heavily lacquered; fractionals of German silver; in polished hardwood box with hinged cover, with forceps; with separate compartment for each weight; fractionals under glass cover.

No.	A	B	C	D	E	F
Size 1 mg to, grams.....	20	50	100	200	500	1000
Per set.....	4.50	5.50	7.00	9.00	12.00	15.00

736. **WEIGHTS, Medium Grade, Metric**, same quality as No. 734, but in polished hardwood block instead of box, with brass forceps.

No.	A	B	C	D	E	F
Size 1 mg to, grams.....	20	50	100	200	500	1000
Per set.....	3.00	3.75	4.50	5.50	9.00	13.00



No. 740.



No. 742.



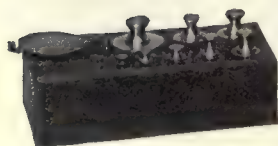
No. 738.



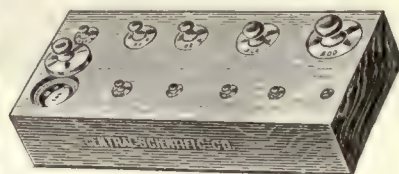
No. 746.



No. 752.



No. 754.

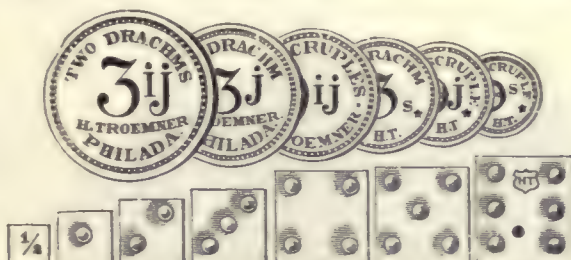


No. 758.

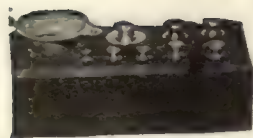
738. **WEIGHTS, Metric**, separate weights, same quality as No. 734 and 736, for replacements.
- | | | | | | | | | | | |
|-------------|--------|-----|-----|-----|-----|-----|-----|------|------|------|
| Size, grams | 1 | 2 | 5 | 10 | 20 | 50 | 100 | 200 | 500 | 1000 |
| Each | \$0.22 | .25 | .28 | .33 | .40 | .50 | .65 | 1.25 | 2.00 | 3.90 |
740. **WEIGHTS, Metric**, of polished brass, flat shape, in hardwood block with hinged cover, suitable for ordinary laboratory work. Nos. A-C are provided with receptacle for the fractional weights which are of German silver. Without forceps.
- | | | | | | | |
|---------|---------|---------|----------|---------|---------|----------|
| No. | A | B | C | D | E | F |
| Size | 1cg-20g | 1cg-50g | 1cg-100g | 1g-200g | 1g-500g | 1g-1000g |
| Per set | 2.25 | 2.75 | 3.35 | 4.50 | 7.00 | 10.00 |
742. **WEIGHTS, Metric**, of brass, same as No. 740, but in hardwood block. Without forceps.
- | | | | | | | |
|---------|---------|---------|----------|---------|---------|----------|
| No. | A | B | C | D | E | F |
| Size | 1cg-20g | 1cg-50g | 1cg-100g | 1g-200g | 1g-500g | 1g-1000g |
| Per set | \$1.65 | 2.00 | 2.75 | 4.00 | 6.00 | 9.00 |
744. **WEIGHTS, Metric, Brass**, same as Nos. 740 and 742, separate for replacements in other sets.
- | | | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Size, grams | 1 | 2 | 5 | 10 | 20 | 50 | 100 | 200 | 500 | 1000 |
| Each | .11 | .14 | .17 | .20 | .25 | .40 | .55 | .95 | 1.80 | 3.35 |
746. **WEIGHTS, Metric, Fractional**, of German silver and aluminum. Set 1 to 500 milligrams, with duplicates of 2, 20 and 200 milligram pieces, in covered hardwood box with sliding cover. Each weight in a separate compartment; with brass forcepsper set 1.65
748. **WEIGHTS, Metric, Fractional**, of German silver and aluminum, put up in sets of 1 mg to 500 mg with duplicates of 2, 20 and 200 mg pieces; in pasteboard box.....per set .50
750. **WEIGHTS, Metric, Fractional, Single**, same as No. 748, for replacements.....Each .05
752. **WEIGHTS, Avoirdupois**, of nickel silver, from 1/128 to 1/4 ounce, consisting of one each 1/128, 1/64, 1/32, 1/16, 1/8, and 1/4 oz.....Per set 2.00
754. **WEIGHTS, Avoirdupois**, of brass, in hardwood block, carefully adjusted.
- | | | | |
|-----------------------|------|------|------|
| No. | A | B | C |
| Size 1/8 oz. to, lbs. | 1 | 2 | 4 |
| Per set | 5.00 | 6.50 | 9.45 |
756. **WEIGHTS, Avoirdupois**, same as No. 754, single for replacements.
- | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|------|--------|------|------|------|
| Size, ounces | 1/8 | 1/4 | 1/2 | 1 | 2 | 4 | 8 | Pounds | 1 | 2 | 4 |
| Each | .29 | .37 | .43 | .51 | .72 | .86 | 1.00 | | 1.45 | 2.30 | 3.90 |
758. **WEIGHTS, Decimal Pound**, brass in block, from 0.5 to 0.001 lb. with duplicates of the 0.1, 0.01, and triplicates of the 0.001 lb. weights. Adds up to make 1 pound. Especially valuable in testing laboratories where results must be reported in English units.....per set 11.00



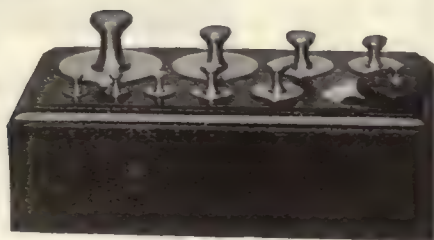
No. 760.



No. 702.

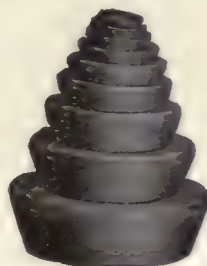


37



38

No. 764.



No. 770.



No. 774.



No. 766.



No. 768.

760. **WEIGHTS, Prescription**, according to the United States Bureau of Standards and the New York Board of Pharmacy. In box with cover from 4 drams to 1/10 grain, consisting of the following individual weights: 4, 2, 1, 1/2 drams; 2, and 1/2 scruples; 10, 5, 2, 1, 5/10, 2/10, and 1/10 grains **per set \$6.00**
762. **WEIGHTS, Prescription**, from 2 drams to 1/2 grain, the dram and scruple weights of brass, coin shaped, the grain weights of nickel..... **per set .80**
764. **WEIGHTS, Troy**, brass, in hardwood block, adjusted to meet requirements of the Bureau of Standards, Tenth Annual Conference on Weights and Measures. Weights below 1/4 ounce furnished in pennyweights and grains unless otherwise specified.
- | No. | A | B | C | D |
|---------------------------------|------|------|------|------|
| Size 1/2 grains to, ounces..... | 1 | 2 | 5 | 10 |
| Per set | 1.65 | 2.60 | 3.60 | 5.85 |
766. **WEIGHTS, Troy**, of aluminum, square, from 1/2 grain to 10 grains, in pasteboard box. Shape is such that they may be picked up readily..... **per set .65**
768. **WEIGHTS, Troy**, from 1/2 grain to 5 grains in pasteboard box. Bent from aluminum wire, in shapes convenient to handle..... **per set .75**

WEIGHTS, ORDINARY GRADE, FOR COARSE WEIGHING

770. **WEIGHTS, Avoirdupois, Iron**, sealed, in nests.

No.	A	B	C	D
Size 1/4 oz. to, lbs.....	1	2	4	8
Per set	2.30	2.80	4.00	6.00

772. **WEIGHTS, Avoirdupois, Iron**, sealed, same quality as above, single for replacements.

Size, ounces	1/4	1/2	1	2	4	8	Pounds	1	2	4	8
Each .....	.35	.35	.35	.35	.35	.70		70	1.00	1.70	3.00

774. **WEIGHTS, Avoirdupois**, of iron with ring handle.

Size, pounds	1	2	4	10	14
Each .....	.55	.85	1.40	2.75	3.35

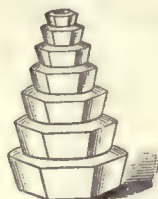
776. **WEIGHTS, Avoirdupois**, safety valve.

Size, pounds	4	8
Each	1.50	2.50

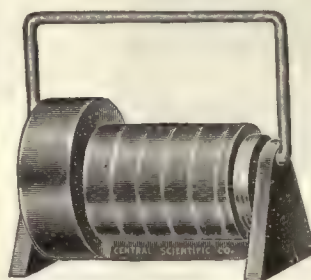


No. 778.

No. 782.



No. 788.



No. 792.



No. 800-802.

778. **WEIGHTS, Metric, Universal.** These weights are of brass, finely finished, and are of a high degree of accuracy. They are provided with a hook at the top and an eye in the bottom, which is concave so that the weights can be stood upright on a platform balance. This is a distinctly high grade set of weights and will be found of great value in physical laboratory experiments, as well as for general weighing. The set consists of nine weights ranging from 10 grams to 1 kilo, with duplicates of the 20 and 200 gram pieces. Complete in finely finished hardwood blockper set \$6.00

780. **WEIGHTS, separate, same as No. 778.**

Size, grams....	10	20	50	100	200	500	1000
Each .....	.25	.38	.50	.55	.65	.90	1.35

782. **WEIGHTS, Metric, Universal.** These weights are made of cast iron, neatly japanned, with the denomination in raised figures. Of same general nature as No. 778, but much less finely finished and accurate. The set comprises nine weights ranging from 10 grams to 1 kilo, with duplicates of the 20 and 200 gram pieces...per set 3.35

784. **BLOCK** of hardwood, with holes to fit No. 782 weights.60

786. **WEIGHTS, separate, same as No. 782.**

Size, grams.	10	20	50	100	200	500	1000	2000
Each .....	.13	.22	.25	.28	.35	.50	.90	1.45

788. **WEIGHTS, Metric, Iron, in nests, carefully adjusted.** Sets have duplicates of 20, 200 and 2000 grams. The 10 kilo weight supplied with handle.

No.	A	B	C	D
Size 5 grams to, kilos..	1	2	5	10
Per set	2.25	3.35	7.25	12.25

790. **WEIGHTS, Metric, Iron, Single, same as in No. 788, for replacements.**

Size, grams	5	10	20	50	100	200	500	Kilos.	1	2	5	10
Each .....	.13	.13	.18	.20	.22	.27	.45		.65	1.10	2.75	5.00

792. **WEIGHTS, Metric, Iron, Slotted, with holder.** Set consists of one 500, five 100, one 50, two 20 and one 10 gram weights. These weights will fit No. 798 Weight Hanger listed below...per set 3.35

794. **WEIGHTS, Metric, Iron, Single.** More accurate and of better finish than No. 792, with slot to fit No. 796 Holder and No. 798 Hanger. Specially designed for use in Physics experiments with simple machines, forces, etc.

Size, grams.....	10	20	50	100	500
Each .....	.22	.28	.33	.45	.65

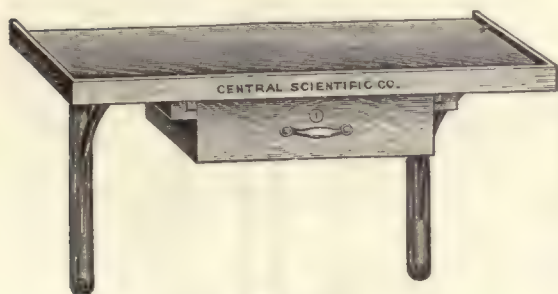
796. **WEIGHT HOLDER, only, of No. 792.** Useful for holding No. 794 weights..... .55

798. **WEIGHT HANGER, for No. 794, weight 50 grams, capacity, 1500 grams..... .50**

800. **WEIGHTS, Metric, Iron, Slotted, for use with hanger No. 802.**

Size, kilos	1/2	1	2	5
Each .....	.45	.65	1.10	2.75

802. **WEIGHT HANGER, for use with No. 800 Weights, of iron with hook; weight, 1 kilo; capacity, 20 kilos** .75



No. 810.



No. 812.



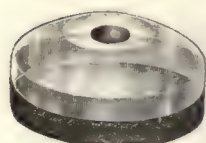
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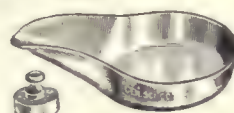
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No. 820.



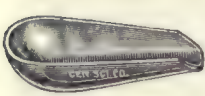
No. 822.



No. 826.

BALANCE ACCESSORIES

810. **BALANCE BRACKET** or support, with drawer and key, for attachment to wall where it will be out of the way and less exposed to vibrations. Size of top surface, 60 x 35 cm, with raised edge **\$9.00**
812. **BALANCE COVER**, of good quality rubber cloth. A very convenient protection to balances. Made to order to fit any balance. When ordering, please give extreme outside dimensions of balance case. Price, according to size, from..... **2.00 to 3.50**
814. **BALANCE DESICCATOR**, triangular in shape to fit in corner of balance case. Of glass, 2 inches on a side, 1½ inches high..... **1.00**
816. **BALANCE LEVEL**, circular brass frame, spirit filled; diameter 25 mm..... **4.00**
818. **BALANCE PANS** of horn, 75 mm in diameter.....**per pair .25**
820. **BALANCE READING GLASS** or magnifier, to place before indicating scale to facilitate rapid readings; on adjustable support..... **5.50**
822. **BALANCE RESTS**, glass, to place under the leveling screws of balances.....**each .10**
824. **BALANCE WATCH GLASSES**, counterpoised, accurately adjusted for analytical work.
- | | | | |
|-------------------|-----|------|------|
| Diameter, mm..... | 50 | 62 | 75 |
| Per pair..... | .90 | 1.00 | 1.25 |
826. **BALANCE WEIGHING SCOOPS**, of aluminum, with lip and counterpoise. Accurately adjusted. Size B holds about 12 gms of wheat flour, size C about 50 gms.
- | No. | A | B | C |
|-------------------------|------|------|------|
| Capacity about, cc..... | 10 | 30 | 125 |
| Each | 2.25 | 2.50 | 4.00 |



No. 828.



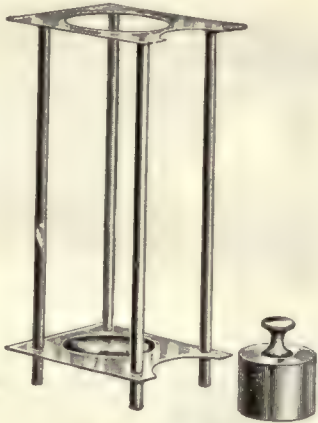
No. 830.



No. 838.



No. 835.



No. 836.

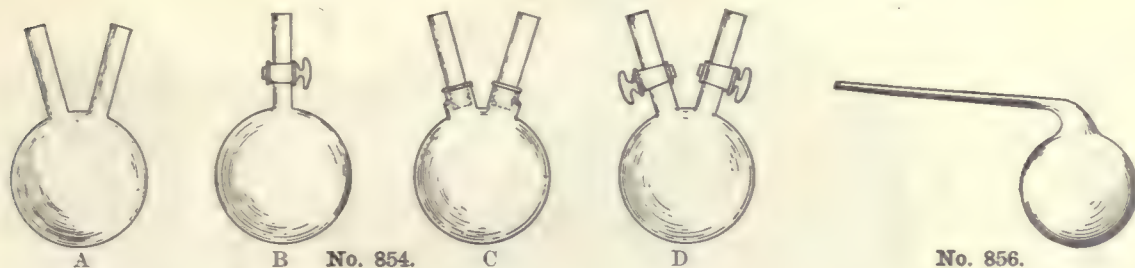


No. 840.



No. 842.

828. BALANCE WEIGHING SCOOP, of glass, flat bottom with spout.		
No.	A	B
Length, mm.....	67	87
Each	\$1.00	1.20
830. BALANCE WEIGHING SCOOP, of German silver, with long spout and with counterpoise..		4.25
832. BALANCE WEIGHING SCOOP, same as above with short spout.....		4.25
834. BALANCE WEIGHING SCOOP, of pure nickel, with spout and counterpoise, accurately adjusted.		
Diameter, 65 mm. Length over all, 95 mm.....		3.00
835. BALANCE WEIGHING SCOOP, Cope, for introducing a weighed sample directly into a long neck flask. The scoop is made of aluminum and has a cylindrical extension and lock pin by which a long handle is attached. Complete with scoop and brass and wooden handle (See Technical Paper 160 of the United States Bureau of Mines).....		2.00
836. BALANCE WEIGHING TUBE SUPPORT, nickel-plated, for horizontal or vertical use...		2.00
838. FORCEPS, for use with sets of weights; brass with curved points; ivory tipped, heavily lacquered		1.50
840. FORCEPS, of brass with curved tips.....		.25
842. WEIGHT BLOCK, of polished wood, with sliding cover, empty, with separate compartments for holding fractional weights No. 712 and 748. Convenient for placing in balance case....		.50

852. **BALLOONS, Collodion, for hydrogen.**

Capacity, cc.....	250	500	1000
Each	\$0.45	.60	.85

854. **BALLOONS, Glass, very thin for weighing gases. Capacity, about 250 cc.**

Style	A	B	C	D
Each	1.10	2.25	2.00	3.90

856. **BALLOON, Glass, Dumas Type, for determining the specific gravity of vapors. Of very thin blown glass. Capacity, about 200 cc.....**

.35

858. **BALLOON, Rubber, pure gum, diameter about 5 cm.....**

.06

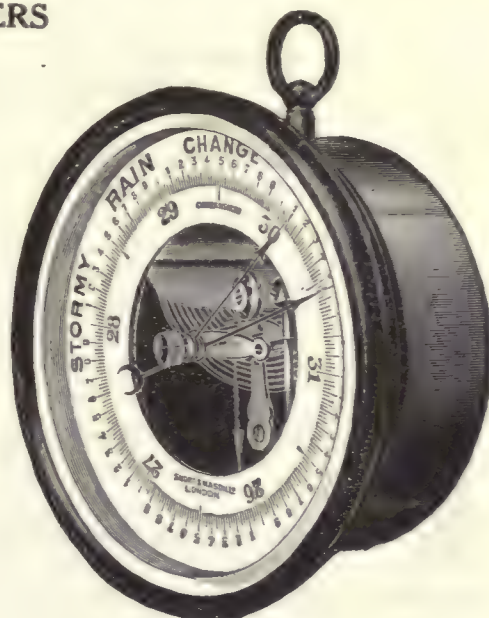
860. **BALLOON, Rubber, pure gum, diameter about 15 cm.....**

.60

BAROMETERS



No. 876.



No. 880.

876. **BAROMETER, Aneroid. Sea Level Reading Type, with rearranged Weather Marks.** This instrument is arranged in such a manner that it is suitable for use in any location from sea level to 3,500 feet elevation. The adjustment is very simple and no derangement of the working parts is necessary. Once adjusted for a given location by the observer, no further adjustment is required. A list showing altitudes of Meteorological Stations in the United States is furnished with each barometer, and also a simple weather forecast card.

To adjust the barometer for altitude for a given city, town or location, turn the brass plate set in the back of the case (this is easily done with the fingers) until the number of feet corresponding to the elevation of the city or town is opposite the arrow. The hand will then point to the proper weather mark and the reading will be the same as that of the U. S. Weather Bureau, which is Sea Level Reading.

Spun brass case, porcelain dial, 5 inches in diameter; adjustable stationary hand for marking the last position of the movable hand.....

12.00

878. **BAROMETER, Aneroid. Same as No. 876, but with metal silvered dial and first quality compensated movement**

18.00

880. **BAROMETER, Aneroid, as adopted by the United States Navy. A brass case barometer of extra quality, with specially finished movement compensated for temperature, and silvered open metal dial graduated to 0.02 inches. For altitudes up to 3,500 feet. Without altitude scale. The best barometer of this style on the market**

18.00



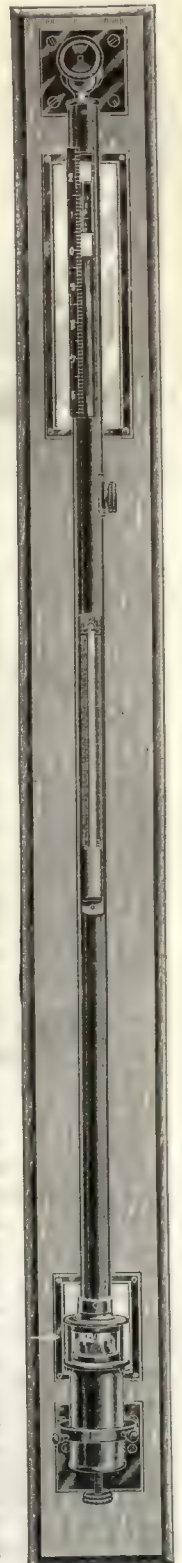
No. 890A.



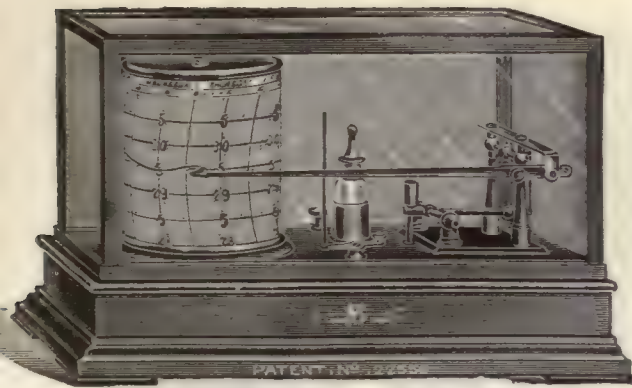
No. 881.

881. **BAROMETER, Aneroid.** Brass case, 5 inches in diameter; open porcelain dial; visible works. Graduated to 0.02 inches.... \$11.00
882. **BAROMETER, Aneroid,** 4-inch card dial, open face, nickel-plated case. Graduations in both English and metric systems. For altitudes up to 3,000 feet. Without altitude scale..... 6.00
- 890A. **BAROMETER, Mercurial, Cenco Improved, Fortin Principle.** Has straight glass tube of heavy wall and uniform bore mounted in a hexagonal brass protecting case, and is provided with a screw adjustment for changing the level of the mercury in the cistern. The scales are readable by means of a vernier to 1/10 mm and 1/200 inch. The lowest possible reading is 25 inches (63.5 cm), so that the barometer is not satisfactory for altitudes above 4,000 feet. (See No. 891A for a high altitude barometer.) Complete with thermometer having both a Centigrade and Fahrenheit scale. 25.00
- 891A. **BAROMETER, Mercurial, Cenco.** Same as No. 890A, but with a scale reading down to 20 inches. For use in altitudes up to 10,000 feet 27.50
894. **BAROMETER, Standard Mercurial, United States Weather Bureau Type, Fortin Principle.** This barometer is of the highest type of excellence, indorsed by the United States Weather Bureau and fully warranted by the manufacturer. The mercury tube is inclosed in a brass body with gun-metal finish, having at its upper end two vertical openings, in which the vernier works, the latter operated by a rack and pinion movement. The readings are taken through these openings, aided by light reflected from a white opaque glass reflector attached to the board behind. The scale is graduated on one side in inches and 10ths, and on the other in centimeters and millimeters, the vernier enabling a reading to be taken, in each case respectively, of one-thousandth of an inch and one-tenth of a millimeter. The attached thermometer consists of a well seasoned tube with both Centigrade and Fahrenheit scales, with the figures etched on the stem. It is so mounted that it can easily be removed for testing, etc. Reads down to 25½ inches and is therefore not satisfactory for altitudes above 3,500 feet.

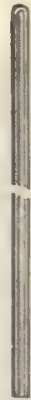
Complete with board back of finely finished hardwood, to which is attached a brass bracket to receive the ring in the top of the barometer, a ring with steadying screws to clamp about the cistern, and white opaque glass reflectors forming a translucent background for reading the instrument..... 65.00



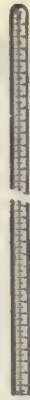
No. 894.



No. 908.



No. 922.



No. 926.



No. 928.



No. 932.



No. 934.

895. **BAROMETER**, Standard Mercurial, United States Weather Bureau Type. Same as No. 894, but without the board back..... \$57.50
896. **BACK** only of No. 894 Standard Barometer..... 7.50
898. **BAROMETER**, Standard Mercurial, United States Weather Bureau Type. Same as No. 894, but with a scale reading down to 20 in. for use in altitudes up to 10,000 feet..... 68.00
899. **BAROMETER**, Standard Mercurial, United States Weather Bureau Type. Same as No. 898, but without board back..... 60.00
900. **BACK** only of No. 898 Standard Barometer, described under No. 894..... 8.00
908. **BAROMETER**, Recording (Barograph). Made in America. The movement is concealed in the base of the instrument and is worked by a large vacuum pan. In mahogany case, glass top and sides, and storage space for charts. Special charts, with instructions for weather forecasting are supplied. Complete with full directions for use, charts for a year, pen and ink. 55.00
909. **BAROGRAPH CHARTS**, for No. 908 Barograph. In boxes containing one year's supply.Per box 2.50
917. **BAROGRAPH CHARTS**, Style No. 2, for old style imported barographs reading 28 to 31 inches. In boxes containing one year's supply.....Per box 2.25
918. **BAROGRAPH CHARTS**, Unfigured, but graduated for a 3 inch range. For old style imported barographs. In boxes containing one year's supplyPer box 2.25
920. **INK**, purple, for Barographs and Thermographs.....Per bottle .50
922. **BAROMETER TUBE**, unfilled, large bore, thick wall, one end sealed. Length, 80 cm.... .37
924. **BAROMETER TUBE**, unfilled, same as No. 922, with glass mercury well and pipette for filling55
926. **BAROMETER TUBE**, unfilled, same as No. 922, but graduated in millimeters..... 2.50
928. **BAROMETER TUBE**, Demonstration Form, unfilled, with funnel top and with stopcock at top and bottom for easy filling and emptying of the tube. Total length, 104 cm. Graduated from 100 to 780 mm in millimeter divisions..... 8.00
930. **MERCURY WELL**, japanned iron. Capacity about 50 cc..... .40
932. **BAROMETER TUBE**, Siphon Type, unfilled, with bulb on short arm. Length, 80 cm..... .75
934. **BAROMETER TUBE**, Siphon Type, Bunsen's, unfilled. Graduated at the top of each arm in millimeter divisions 4.00



No. 940.

No. 946.

No. 948.

No. 958.

BATTERIES, PRIMARY

940. **BATTERY, Bunsen**, for open circuit work. A powerful two-fluid cell of about 1.9 volts E. M. F. and 1.86 ohms internal resistance. An excellent cell for operating induction coils, motors, etc., and for electrolysis of water. Quart size, complete without chemicals..... \$2.25
941. **CARBON** for No. 940..... .12
942. **ZINC CYLINDER** with binding post for No 940 1.50
943. **CLAMP** for No. 941 Carbon, with binding post for wire..... .30
944. **POROUS CUP**, 2x4 inches, for No. 940..... .35
- 8040A. **GLASS JAR**, 4x5 inches, for No. 940..... .20

946. **BATTERY, Burn-Boston Addwater**. A battery containing an exact balance of active elements, zinc, carbon, and salt solution.

In dry cells destruction of the elements goes on continuously, whether used or not. In the Burn-Boston this process is arrested while the current is not being used.

The zinc shell, being insulated from the electrolyte, cannot be acted upon by it. Except for a pin hole vent the cell is tightly sealed. All sources of leakage are thus done away with.

Distinctive Features.

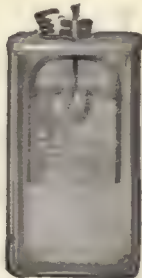
- (1) Yields from three to twelve times the service of dry cells.
- (2) Will never leak or burst.
- (3) Can be stored, fully charged, for any length of time and in any climate.
- (4) Will yield all of its phenomenal electrical content whether the period of use is three months or three years.

Size, $7\frac{1}{2} \times 2\frac{1}{16} \times 2\frac{1}{16}$ inches; voltage, 1.5 volts; amperage, 20 amperes..... 1.25

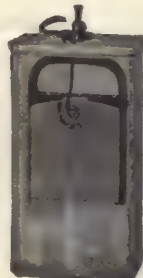
948. **BATTERY, Carbon Cylinder**, for open circuit work. Well adapted for all telephone and bell service. Initial output, 1.4 volts, 6 amperes. Cell complete with chemicals..... .70
949. **CARBON** for No. 948..... .40
950. **ZINC ROD** with binding screw for No. 948..... .08
951. **GLASS JAR** for No. 948..... .30
958. **BATTERY, Daniell**, gallon size. This has been the standard cell for many years for open or closed circuit work. The best for all laboratory work in electrical measurements. Next to the standard cells, it gives the most constant E. M. F., about 1.08 volts, which remains the same during the life of the cell. Internal resistance from 2 to 5 ohms. With new form riveted copper pocket for holding copper sulphate crystals. Complete without chemicals..... 2.00
959. **COPPER, New Form**, with riveted copper pocket, for No. 958..... .80
960. **ZINC**, weight about two pounds, with binding screw attached, for No. 958..... .60
961. **POROUS CUP**, 3x7 inches, for No. 958..... .50
- 8040C. **GLASS JAR**, 6x8 inches, for No. 958..... .40



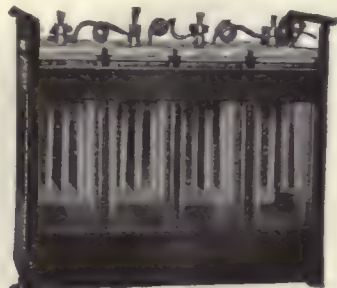
No. 964.



No. 966A-B.



No. 966D.



No. 971 (with cells).

964. **BATTERY, Dry, Columbia, Red Label No. 6.** The best dry cell on the market. E. M. F. on open circuit, 1.5; maximum amperage, 4 to 6; E. M. F. after delivering $\frac{1}{2}$ ampere for thirty minutes, 1.36 \$0.40

BATTERY, Edison Primary, the latest development, embodying all the good features of and many improvements in the class of cells formerly known as the Edison Lalande and later as the Edison Bisco Battery. The elements are the same as in the earlier types but the efficiency and effective capacity have been greatly increased by a better proportioning of active materials and by an improved method of suspension. These cells are the best type of wet cell for continuous service because of their very low internal resistance and ease of renewal of exhausted parts. The new type of cell is contained in glass jars made of the new heat resisting glass, which possesses also greater mechanical strength than the porcelain jars formerly supplied. In selecting cells for laboratory use, it is important to select a sufficient number to secure the necessary voltage and to select those of size and capacity great enough to deliver current at the proper rate, as the larger sizes have very low internal resistance and long life and consequently operate at lowest maintenance cost. Initial E. M. F., 0.95 volts, decreasing to about 0.65 on average load.

Distinctive Features.

- (1) E. M. F. constant through life of cells.
- (2) Simplicity and ease of renewal.
- (3) Visible indication of approaching exhaustion.
- (4) Uniformity of units.
- (5) Long life and service.
- (6) Entire absence of local action.
- (7) Low maintenance cost.

	A	B	C	D
Number	202	252	402	502
Type	3 $\frac{3}{8}$ x6x11	3 $\frac{3}{8}$ x6x12	5 $\frac{3}{8}$ x6 $\frac{3}{8}$ x12 $\frac{1}{4}$	5 $\frac{3}{8}$ x6 $\frac{3}{8}$ x12 $\frac{1}{2}$
Size over all, inches.....				
Average internal resistance, ohms	0.05	0.05	0.04	0.04
Capacity, ampere hours.....	200	250	400	500
966. COMPLETE CELL	4.05	4.25	5.70	6.15
967. COMPLETE RENEWAL	2.25	2.45	3.15	3.60
968. GLASS JAR	1.40	1.50	2.40	2.40
969. PORCELAIN COVER .....	.45	.45	.50	.50
970. TERMINAL NUTS AND WASHERS.....Per set	.25	.25	.25	.25

971. **BATTERY TRAYS**, of pressed steel heavily japanned, for use in assembling Edison primary batteries in units of various sizes. Provided with handles and with open sides for inspection of elements. For use only with types 202 and 252 cells.

	A	B	C
Number	2022	2023	2024
Type	2	3	4
For cells, number.....			
Size over all, inches.....	6 $\frac{1}{2}$ x11 $\frac{1}{2}$ x8	6 $\frac{1}{2}$ x11 $\frac{1}{2}$ x12	6 $\frac{1}{2}$ x11 $\frac{1}{2}$ x15 $\frac{1}{2}$
Each	2.40	2.70	3.00
Number		D	E
Type		2025	2026
For cells, number.....		5	6
Size over all, inches.....		6 $\frac{1}{2}$ x11 $\frac{1}{2}$ x19 $\frac{1}{4}$	6 $\frac{1}{2}$ x11 $\frac{1}{2}$ x23
Each		3.30	3.60



No. 972.



No. 976.

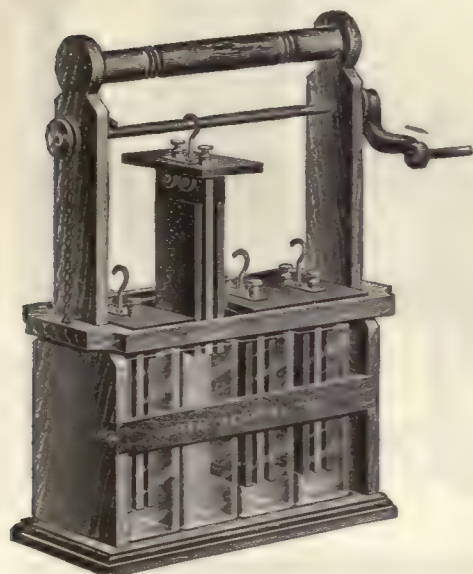


No. 980.



No. 994.

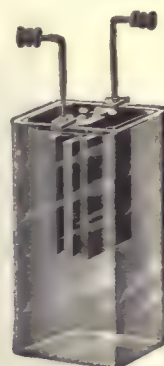
972.	BATTERY, Fuller, improved form, for open or closed circuit work. E. M. F. about 2 volts; initial internal resistance about 0.25 ohms. Gallon size, complete without chemicals.	\$2.00
973.	CARBON AND COVER for No. 972	.90
960.	ZINC for No. 972	.60
961.	POROUS CUP for No. 972	.50
8040C.	GLASS JAR, 6x8 inches, for No. 972	.40
976.	BATTERY, Gravity, Crowfoot Type, especially adapted for closed circuit work. Standard type for telegraph companies. E. M. F. about 1.1 volts; internal resistance from 1 to 5 ohms. Gallon size, complete without chemicals.	1.20
977.	COPPER for No. 976	.17
978.	CROWFOOT ZINC, with connector, for No. 976	.70
8040C.	GLASS JAR, 6x8 inches, for No. 976	.40
980.	BATTERY, Grenet, French Type, pint size. Most convenient form for use on lecture table, giving very powerful current for a short time. The E. M. F. is 2 volts at the start. Small internal resistance. Height of cell 8 inches. Complete without chemicals.	2.00
981.	CARBON for No. 980	.15
982.	ZINC for No. 980	.25
983.	GLASS JAR for No. 980, complete with brass ring	.60
984.	BATTERY, Grenet, French Type, one-quart size. 10 inches high. Complete without chemicals.	2.50
985.	CARBON for No. 984	.20
986.	ZINC for No. 984	.30
987.	GLASS JAR for No. 984, complete with brass ring	.90
988.	BATTERY, Grenet, French Type, two-quart size. 12 inches high. Complete without chemicals.	3.35
989.	CARBON for No. 988	.35
990.	ZINC for No. 988	.40
991.	GLASS JAR for No. 988, complete with brass ring	1.20
994.	BATTERY, Le Clanche, for open circuit work. Initial output, 2 to 4 amperes at 1.45 volts. Complete with chemicals	.65
995.	POROUS CUP, sealed, for No. 994, complete with chemicals	.50
950.	ZINC ROD with binding screw for No. 994	.08
997.	GLASS JAR for No. 994	.17



No. 1008.



No. 1002.



No. 1000.



No. 1016.



No. 1020.

1000. **BATTERY, Cenco Plunge, Single Cell.** A powerful, compact form of the bichromate battery, expressly designed for laboratory and lecture table work. Elements can be quickly lifted out of the solution when not in use. Fiber top, with nickel-plated brass trimmings. Large zinc and carbon elements placed close together, reducing the internal resistance to a minimum. Initial E. M. F., about 2 volts; internal resistance when freshly charged, 0.15 ohms. \$2.75
1001. **BATTERY, Cenco Plunge, Two Cells, in case with handles** 6.50
1002. **BATTERY, Cenco Plunge, Four Cells, in case with handles** 12.50
1003. **BATTERY, Cenco Plunge, Six Cells, in case with handles** 18.00
1004. **CARBON PLATE** for Cenco Plunge Battery, $4 \times 3 \times \frac{1}{4}$ inches25
1005. **ZINC PLATE** for Cenco Plunge Battery, $4 \frac{1}{4} \times 3 \times \frac{1}{4}$ inches40
1006. **GLASS JAR** for Cenco Plunge Battery, $4 \times 4 \times 8$ inches55
1008. **BATTERY, Laboratory Plunge, Four Cells.** Similar in construction to the Cenco Plunge Battery described above, the essential difference being in the elements, which are larger, and the case, which has an easy lifting motion, with a deadfall catch not liable to slip. The elements are quickly removed from the solution. Each cell may be used singly, two or more in series, or in parallel. Any cell which is not required for use can be suspended by the hook from the axle. All parts are interchangeable. Unquestionably the best battery for the lecture table. Initial E. M. F., about 2 volts per cell; internal resistance when freshly charged, 0.15 ohms. Complete with case 14.00
1010. **BATTERY, Laboratory Plunge, Six Cells.** Same description as No. 1008. Complete in case 18.00
1011. **CARBON PLATE** for Laboratory Plunge Battery, $6 \frac{1}{2} \times 2 \frac{1}{2} \times \frac{1}{4}$ inches25
1012. **ZINC PLATE** for Laboratory Plunge Battery, $6 \frac{1}{4} \times 2 \frac{1}{2} \times \frac{1}{4}$ inches60
1013. **ELEMENTS COMPLETE** for Laboratory Plunge Battery. Two carbon plates, zinc plate, fiber top, binding posts and hooks 1.65
1014. **GLASS JAR** for Laboratory Plunge Battery, $2 \frac{1}{2} \times 4 \frac{1}{4} \times 7$ inches55
1016. **BATTERY, Samson No. 2.** A popular battery for open circuit work. It is the best, most durable and effective of all cells of the carbon cylinder type. Recuperates very quickly. Dimensions over all, $4 \frac{1}{2} \times 4 \frac{1}{2} \times 8$ inches. E. M. F., 1.5 volts. Internal resistance about 0.07 ohms. Complete with chemicals 2.25
1017. **CARBON**, for No. 1016 1.25
1018. **ZINC CYLINDER**, for No. 101675
1019. **GLASS JAR**, for No. 101635
1020. **BATTERY, Samson No. 3.** Same as No. 1016, but larger. Dimensions over all, $5 \frac{1}{4} \times 5 \frac{1}{4} \times 8 \frac{1}{2}$ inches. E. M. F., 1.5 volts. Internal resistance about 0.06 ohms. Complete with chemicals. 3.00
1021. **CARBON**, for No. 1020 1.50
1023. **ZINC CYLINDER**, for No. 102095
1024. **GLASS JAR**, for No. 102075



No. 1028.



No. 1032.



No. 1036A-D.



No. 1036E.

1026. **BATTERY, Standard Cell**, glass part only, with platinum wires, for those desiring to make their own standard cells. This is the regular H form and may be used to make any of the ordinary forms of standards. \$1.30
1027. **BATTERY, Standard Cell**, glass part only, without platinum wires..... .80
1028. **BATTERY, Standard Cell**, same as No. 1026, on stand as illustrated..... 3.00
1030. **BATTERY OF FIVE STANDARD CELLS**, consisting of five No. 1026 mounted on supports and base provided with bars, traveling plugs and binding posts for convenient combination in series and parallel 12.50
1032. **BATTERY, Standard Cell, Weston**, unsaturated type, Model 4. Consists of an H-shaped receptacle with platinum leads which pass through the bottom. One limb of the cell contains cadmium amalgam; the other mercury and a paste of mercurous sulphate. The cell is filled to slightly above its cross arm with an unsaturated solution of cadmium sulphate and sealed to prevent evaporation. Porcelain separators prevent the ingredients from becoming mixed. E. M. F. between 1.0184 and 1.0189 volts. With manufacturers' certificate of voltage..... 19.00
1033. **BATTERY, Standard Cell, Weston**. Same as No. 1032, but with Bureau of Standards certificate. 23.50

BATTERIES, STORAGE

BATTERIES, Cenco Storage. These batteries, which are made for us by one of the most reliable manufacturers, have been used extensively for years with increasing satisfaction in all classes of service. The different sizes in each class have the same plate construction, the only difference being in the size and capacity of the plates or elements. The voltage is approximately two volts at the beginning of discharge. Each battery is guaranteed against electrical or mechanical defects, and within the discharge rates specified they will give their full rated capacities. When charged at the normal rate given for 8-hour discharge rate the cells will be charged in 9 hours. Full directions will be sent with each battery for its charging and proper care.

No.	A	B	C	D	E	F	G	H	J	K	L
No. of plates.....	2	2	2	2	5	7	9	7	9	11	13
Size of plates.....	3x4	5x5	7x5	8¾x5	5¾x6	5¾x6	5¾x6	7¾x7¾	7¾x7¾	7¾x7¾	7¾x7¾
Output at normal discharge rate, ampere hours....	8	16	24	32	64	96	128	180	240	300	360
Charging rate, amperes...	1	2	3	4	8	12	16	22½	30	37½	45
Discharge rate for 8 hours, amperes	1	2	3	4	8	12	16	22½	30	37½	45
Discharge rate for 5 hours, amperes	1½	3	4½	6	10	15	20	30	40	50	60
Length of jar, inches....	1¾	2¼	2¼	2¼	4¾	6¾	7½	6½	7¾	8½	11
Width of jar, inches.....	3¾	6¼	6¼	6¼	7¾	7¾	7¾	9½	9½	9½	9½
Height of jar, inches....	7	8	10	12	9½	9½	9½	11½	11½	11½	11½
Weight of cell, complete with electrolyte, lbs....	4	7½	11	13½	30	39	49	51	63	79	96
1036. COMPLETE CELL , without electrolyte	1.50	2.50	3.45	4.35	10.00	11.10	16.40	18.40	23.30	27.60	33.70
1037. GLASS JAR only											
Each .....	.70	.80	1.00	1.25	1.50	1.50	1.75	2.25	2.75	3.50	9.00



No. 1040.



No. 1042.



No. 7698.

BATTERIES, Cenco Portable Storage. These batteries are of the same general type as the Cenco Storage Batteries described on the preceding page, but are especially made to stand transportation. Under ordinary conditions they should last for at least five years, and they are guaranteed for one year against everything except abusive handling. The jars are of the best vulcanite, and are enclosed in hardwood cases provided with a handle and finished with acid-proof paint. Strength is added to the jar when placed in the case by entirely surrounding it with an elastic sealing compound. Short circuiting is prevented by an exceptionally wide distance between the plates. The acid cannot spill under any ordinary conditions of service. Batteries are charged ready for use. Initial E. M. F., 6 volts.

No.	A	B	C	D
Output at normal discharge rate, ampere				
hours	40	60	80	120
Charging rate, amperes	4½	6	7	8½
Discharge rate for 8 hours, amperes.....	5	7½	10	15
Length, inches	8½	10	11	14¾
Width, inches	5	6	7	7¼
Height, inches	9	9¼	9¼	9¼
Weight of cell, complete with electrolyte, lbs....	23	35	45	66
1040. COMPLETE CELL, charged.....	\$14.30	17.50	25.75	31.25

BATTERIES, Cenco Sealed Storage. These batteries are contained in glass jars, sealed with a smooth and strong compound, and are ideal for isolated and portable work where care in handling may be given. They are especially desirable for clock and bell systems, and for demonstration work. Each cell is made up with a negative plate on either side of the positive, giving equal action on each side and preventing buckling and sulphation. The sealing compound prevents evaporation of the electrolyte and keeps the cell clean at all times. The batteries are shipped completely assembled and charged ready for immediate use. Initial E. M. F., 2 volts.

No.	A	B	C	D
Output at normal discharge rate, ampere				
hours	8	16	36	56
Charging rate, amperes	1¼	2½	5	8
Discharge rate for 8 hours, amperes.....	1	2	4½	7
Length, inches	4	4	6¼	6¼
Width, inches	2½	2½	3	3
Height, inches	10½	10½	15	15
Weight of cell, complete with electrolyte, lbs....	10	11	22	24
1042. COMPLETE CELL, charged.....	3.50	4.40	7.00	8.60

7698. **BATTERY TESTER**, or Syringe Battery Hydrometer. A very convenient form of battery hydrometer, which eliminates the spilling of acid when making a battery test. The pointed tube is inserted into the battery and the electrolyte drawn up into the hydrometer containing tube by means of the rubber bulb. After the reading is obtained the fluid is ejected back into the battery. Complete table showing relation between specific gravity and battery strength included

7699. **HYDROMETER** only of No. 7698..... .45



No. 1044E.

BATTERIES, Storage, Exide Laboratory. These batteries are extensively used in scientific laboratories, both in this country and Europe. We guarantee them to give good service at the capacities designated.

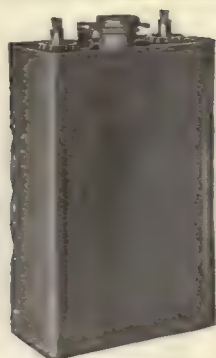
The voltage of each cell of all capacities is slightly above two volts on open circuit and during discharge at the eight-hour rate varies from that point at the beginning to 1.75 volts at the end.

We have selected types that are adapted to the various laboratory demands. Other sizes will be quoted upon application. Cells must be charged before using. All cells are in glass jars.

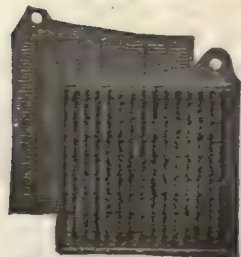
The prices given include the electrolyte and connecting bolts.

Note: If desired for permanent installation in units of two or more, cells may be ordered with connecting straps burned together.

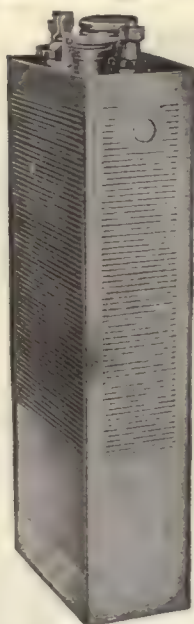
No.	A	B	C
Type	PT	ET	D
No. of Plates	2	2	7
Size of Plates	8¾x5	7¾x7¾	6x6
Output at normal discharge rate, ampere hours.....	24	36	60
Charging rate, amperes.....	3	4½	7½
Discharge rate for 8 hours, amperes.....	3	4½	7½
Discharge rate for 5 hours, amperes.....	4½	6½	10½
Discharge rate for 3 hours, amperes.....	6	9	15
Length of jar, inches.....	2½	2½	6¾
Width of jar, inches.....	6	8¾	7¾
Height of jar, inches.....	12	11	10¼
Height of complete cell, inches.....	12½	11½	15¾
Weight of cell, complete with electrolyte, lbs.....	13½	22	42¾
1044. COMPLETE CELL , with electrolyte, but not charged...	\$7.25	9.10	18.80
1045. GLASS JAR only.....	1.50	1.80	2.55
No.	D	E	F
Type	E	E	E
No. of Plates	5	7	9
Size of Plates	7¾x7¾	7¾x7¾	7¾x7¾
Output at normal discharge rate, ampere hours.....	80	120	160
Charging rate, amperes.....	10	15	20
Discharge rate for 8 hours, amperes.....	10	15	20
Discharge rate for 5 hours, amperes.....	14	21	28
Discharge rate for 3 hours, amperes.....	20	30	40
Length of jar, inches.....	5¾	6¾	8¼
Width of jar, inches.....	9½	9½	9½
Height of jar, inches.....	12¾	12¾	12¾
Height of complete cell, inches.....	17¾	17¾	17¾
Weight of cell, complete with electrolyte, lbs.....	58	80	100¼
1044. COMPLETE CELL , with electrolyte, but not charged...	21.90	29.60	37.35
1045. GLASS JAR only.....	2.80	3.30	3.90



No. 1048C.



Plates of No. 1048C.



No. 1048E.



No. 1050A.

BATTERIES, Edison Storage. These batteries are composed of negative plates of iron oxide and positive plates of nickel oxide immersed in an alkaline solution. The retaining cans are of corrugated sheet steel, welded at the seams, and electroplated with nickel, which protects the steel from rust and gives each cell an attractive appearance. They are made in two types: Type "A" for heavy current duty; Type "B" for lighter work, such as for ignition, small lighting outfits, clocks, bells, etc. These batteries are guaranteed for five years if directions are carefully followed.

DISTINCTIVE FEATURES.

Light weight and small space occupied.
No sulphating or deterioration on open circuit.
No breakage of containers.
Extremely long life in service.

Freedom from obnoxious fumes.
No injury from short circuits.
Low maintenance cost.

Freedom from sensitiveness to external conditions such as temperature, vibration, concussion, etc.

Number	A	B	C	D	E	F
Type	B1-H	B-2	B-4	B-6	A-4	A-6
No. of positive plates.....	1	2	4	6	4	6
Output at normal discharge rate, ampere hours	18.75	37.5	75.0	112.5	150.0	225.0
Charging rate, amperes.....	3.75	7.5	15.0	22.5	30.0	45.0
Discharge rate for 8 hours, amperes....	2.25	4.75	9.5	14.0	18.5	28.0
Discharge rate for 5 hours, amperes....	3.75	7.5	15.0	22.5	30.0	45.0
Mean effective internal resistance, ohms.	.024	.012	.006	.004	.003	.002
Length of jar, inches.....	1.55	1.55	2.58	3.75	2.64	3.80
Width of jar, inches.....	5.03	5.03	5.09	5.09	5.13	5.13
Height of complete cell, inches.....	10.44	8.69	8.69	8.78	13.38	13.38
Weight of renewal solution per cell, lbs.	2.0	1.0	1.7	2.5	2.9	4.3
Wgt. of cell, complete with electrolyte, lbs.	4.9	4.7	7.5	10.8	13.9	19.4

1048. **COMPLETE CELL**, with electrolyte, but not charged \$4.95 7.26 9.68 13.31 16.34 24.20

BATTERIES, Edison Storage, supplied in sets of five, assembled in standard suspension trays contained in a steel battery box. The initial voltage of each set is 6.5 volts and the direct current voltage necessary to charge is 9.

No.	A	B
Type	B-2	B-4
Output at normal discharge rate, ampere hours.....	37.5	75
Charging rate, amperes.....	7.5	15
Weight, lbs., in tray.....	27	41.5
Height, inches	10 1/4	10 1/4
Width, inches	7 1/2	7 1/2
Length, inches	11 1/4	17 1/4
1050. BATTERY , complete in box.....	39.60	51.70

1051. **ELECTROLYTE** for renewal of Edison Storage Batteries. In cans.

No.	A	B
No. of pounds in can.....	2	5
Per can .....	.40	.75

BATTERY DIRECTIONS

Amalgamating. A good method for amalgamating a zinc element is to dip it into acid, then pour a few drops of mercury on the surface and rub in with a piece of cloth attached to a stick. This is perhaps the best and quickest method although the most expensive.

Amalgamating Fluid. 2 ounces mercury, 1 ounce aqua regia, 10 ounces water. Dip zinc into solution and then wash with water. No need of brush or rag. Zinc element should be thoroughly cleaned before amalgamating by means of a metal scratch brush or coarse emery cloth.

Bunsen Battery. Outer cell contains amalgamated zinc plate dipping into dilute sulphuric acid (by weight 10 parts water to 1 part acid). In inner porous cup, a piece of carbon dips into nitric acid of full strength. Obnoxious nitrogen oxide fumes may be suppressed in a large measure by the addition of a small quantity of potassium dichromate. If desired the nitric acid may be replaced by a chromic acid solution. (See Sulpho-Chromic Salt below.)

Burn-Boston Battery. To make active, ready for use, add plain water.

Carbon Cylinder Battery. Place 6 ounces ammonium chloride in jar and fill with water to two-thirds its capacity. Stir well until the salt is entirely dissolved. Place elements with zinc inside carbon cylinder as illustrated.

Columbia Dry Battery. Should be entirely discarded after its amperage has dropped to a point unfitting it for use, as it cannot be recharged.

Daniell Battery. The zinc element is placed in a porous cup containing sulphuric acid (1 part acid to 20 parts water, by weight). The copper element encircles a porous cup and dips into saturated copper sulphate solution, kept continually saturated by the addition of an excess of copper sulphate crystals on bottom of jar. Solution is more effective by addition of few cubic centimeters of sulphuric acid.

(In our No. 958 a pocket is provided for holding excess crystals of copper sulphate.)

Edison Primary Battery. The exhaustion of the cell is indicated by holes appearing in the lower part of the zinc plates. When this point is reached, a complete renewal (see No. 967) should be obtained as the parts are so proportioned that all become exhausted at the same time. Directions are furnished with each renewal.

Fuller Battery. Fill glass jar half full of chromic acid solution made from Sulpho-Chromic Salt (see below), place 1 teaspoonful mercury and 2 tablespoons full of common salt in the porous cup and fill with water to $1\frac{1}{2}$ inches of top. The carbon element containing the porous cup is then placed in the glass jar, the zinc is placed in the glass jar and the cover over it. The solution should fill the glass jar to within an inch of the top.

Gravity Battery. This type of battery is merely a form of Daniell cell, where the two solutions are kept separate by their difference in specific gravity. Place 2 pounds copper sulphate crystals in bottom of jar with copper element. Add clear water to fill the jar when elements are in position. Suspend zinc over edge of jar and connect the two plates through a resistance of 10 ohms or more. When the solutions have separated, that around the zinc plate being colorless, while that around the copper is blue, the cell is ready for action. If during this time the zinc plate has become covered with precipitated copper, it should be taken out and brushed off until the surface is bright. The separation of the two solutions may be hastened by adding some crystals of zinc sulphate or a small amount of dilute sulphuric acid.

Grenet Battery. In this cell, the zinc plate between two carbon plates dips into a chromic acid solution. (See below.) When this cell is exhausted, the rich reddish color of chromic acid will be replaced by a muddy dark green color.

Chromic Acid Solution. There are many different formulae, but the most convenient method of making a generally useful acid is by simply dissolving prepared chromic acid salt in water. (See Sulpho-Chromic Salt, below.)

A useful formula is, 30 parts sodium dichromate, 100 parts water and 23 parts sulphuric acid (sp. gr. 1.845); all by weight.

LeClanche Battery. Directions furnished under carbon cylinder cell apply to this type of cell, except that zinc rod is placed outside of porous cup.

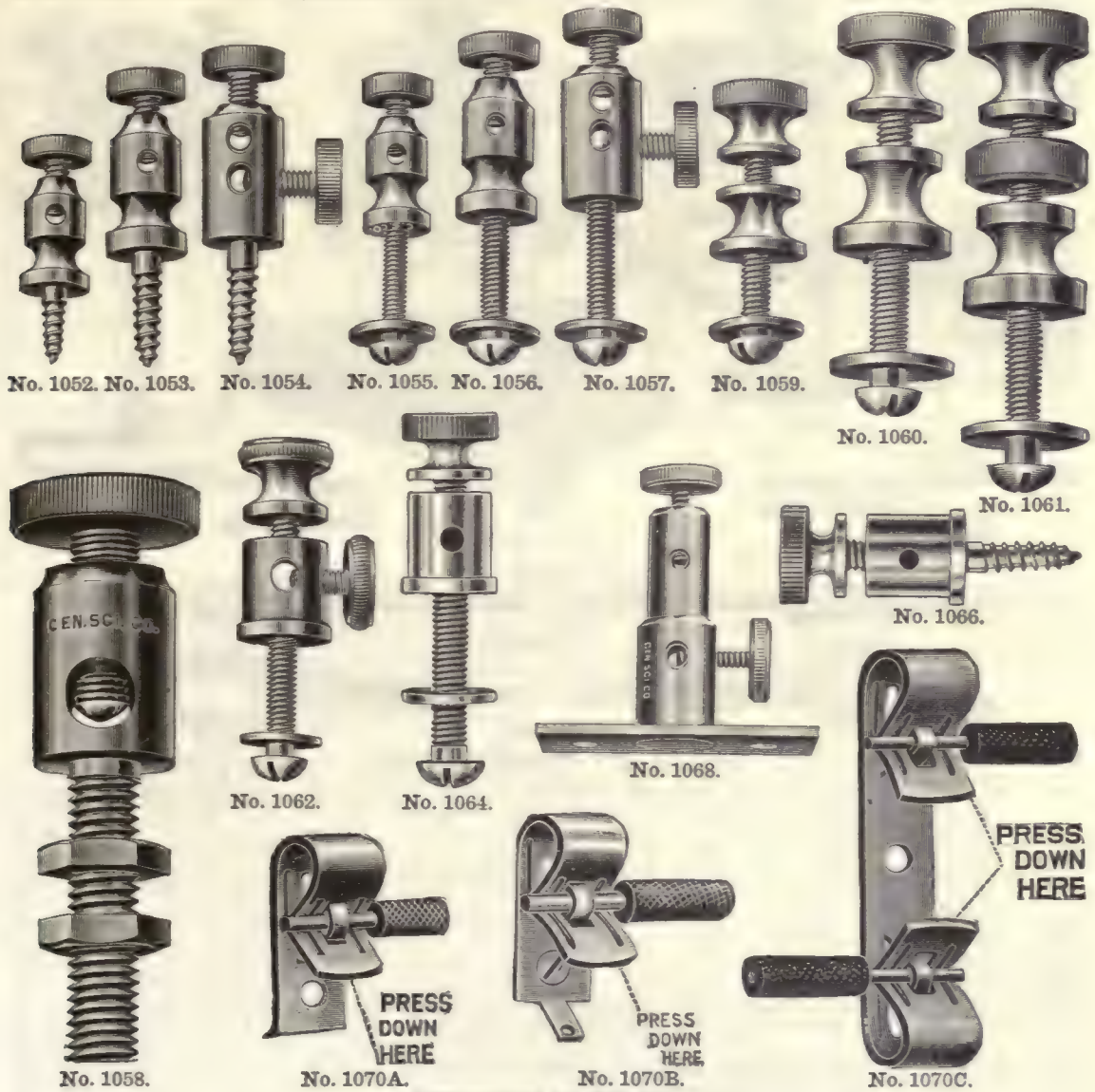
Plunge Battery. Elements and directions under Grenet type apply to this type of battery.

Samson Battery. Directions furnished under carbon cylinder cell apply to this type of cell.

Storage Batteries. These cells make the most convenient source of electrical supply, providing the laboratory is equipped for charging. Full directions for use and for charging accompany each cell.

BATTERY FLUID

CENCO SULPHO-CHROMIC SALT. (Formula patented.) For making Battery Fluid for Plunge Batteries and Grenet Cells and to replace the Nitric Acid in Grove and Bunsen Cells it will be found that Cenco Sulpho-Chromic Salt is without an equal. Its use does away with all handling of acids in liquid form. One jar (2 lbs.) is sufficient for three quarts of battery fluid.....Per jar \$0.80

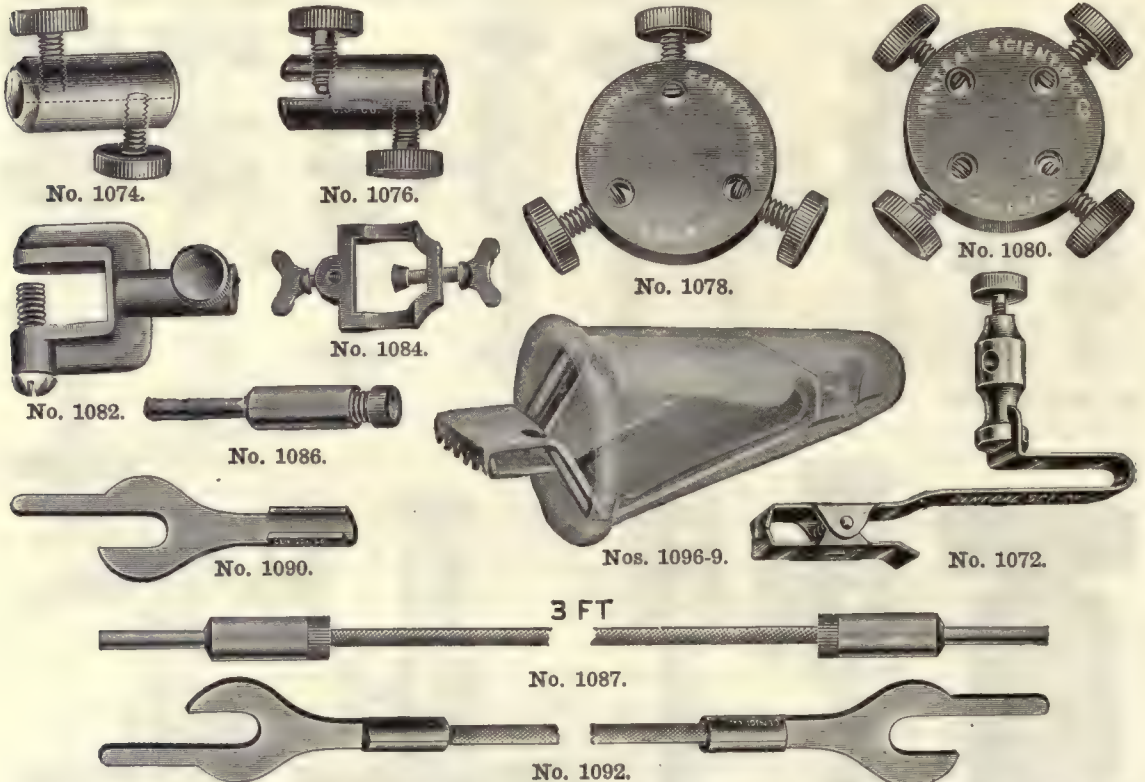


Illustrations are full size.

BATTERY BINDING POSTS

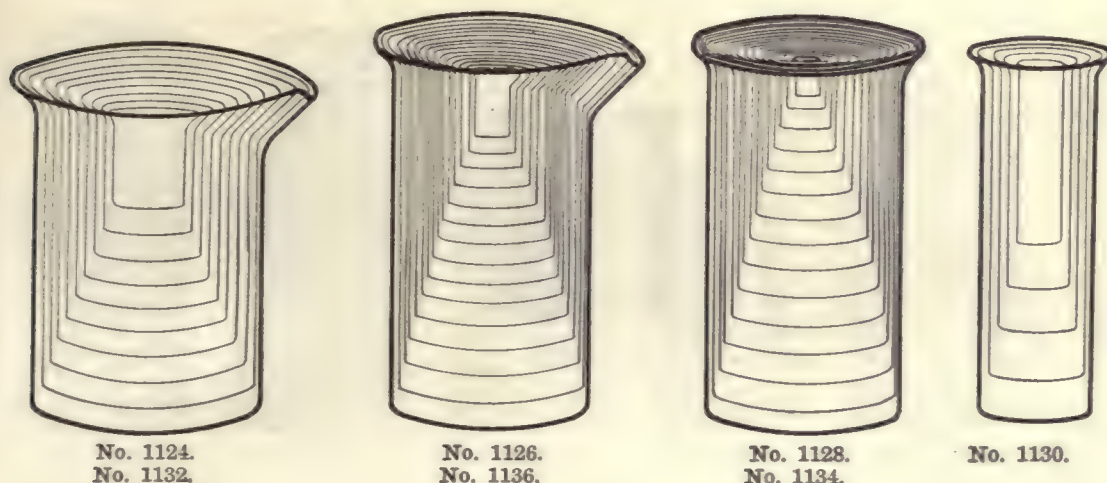
1052. BINDING POST,	American form, with wood screw, small	\$0.10
1053. BINDING POST,	American form, with wood screw, large .....	.15
1054. BINDING POST,	American form, with wood screw, double .....	.20
1055. BINDING POST,	American form, with machine screw, small .....	.10
1056. BINDING POST,	American form, with machine screw, large .....	.15
1057. BINDING POST,	American form, with machine screw, double .....	.20
1058. BINDING POST,	American form, extra heavy with two nuts for attaching to board or table top.	1.00
1059. BINDING POST,	English form, with machine screw, small .....	.15
1060. BINDING POST,	English form, with machine screw, large .....	.25
1061. BINDING POST,	English form, with machine screw, large, double .....	.30
1062. BINDING POST,	combined American and English form, with machine screw .....	.30
1064. BINDING POST,	new form, combined American and English, with machine screw .....	.30
1066. BINDING POST,	new form, combined American and English, with wood screw .....	.25
1068. BINDING POST,	with plate for wood screws, double .....	.30
1070. BINDING POST, Spring,	Fahnestock Patent. Will take any size wire up to No. 10 B. & S. gauge. Styles A and B are identical, except B is provided with a lug to which wire may be soldered. Style C is double.	

No.	A	B	C
Length, inches	1 1/16	1 1/16	2 1/16
Width, inches	3/8	3/8	3/8
Each .....	.03	.04	.08

**BATTERY CONNECTORS**

Illustrations are full size.

1072. **CONNECTOR, Clip**, for holding small electrodes in experimental work on electroplating. A small American binding post soldered to a spring clip; handle of clip bent to hang over edge of battery jar or tumbler. \$0.30
1074. **CONNECTOR, double**12
1076. **CONNECTOR, double**; one end for wire and other slotted for receiving plates $\frac{1}{8}$ -inch thick or less.20
1078. **CONNECTOR, triple**30
1080. **CONNECTOR, quadruple**.40
1082. **CONNECTOR, for zinc**.30
1084. **CONNECTOR, for carbon**.30
1086. **CONNECTOR TIP**, for use in making connections with American binding posts.12
1087. **CONNECTOR**, consists of two No. 1086 connector tips attached to ends of 3 feet flexible silk cord.45
1090. **CONNECTOR TIP, Universal**, for use in connecting to either English or American binding posts. Very convenient. To be soldered to cord.05
1092. **CONNECTORS**, consisting of two No. 1090 Connector Tips soldered to the ends of flexible silk cord.
- | | | |
|---------------------------------|-----|-----|
| No. | A | B |
| Length of cord, inches. | 6 | 36 |
| Each | .20 | .30 |
1094. **CORD, Flexible Silk**, as used on Nos. 1087 and 1092. For small currents. Per yard .10
- UNIVERSAL TEST CLIPS.** Time savers in any electrical work requiring quick temporary connections, since they may be attached to the ends of a connecting wire and used to make connections at any point by simply clipping on to binding posts or wire. Made of copper and may be used over and over again. Suggested for use with test sets, with voltmeters, on shop testing devices, as a helix clip, by meter departments, in college and commercial laboratories, on motor and transformer test floors, in motion picture projection work and in charging storage batteries. For storage battery work the lead plated clip No. 1098 should be specified.
1096. **TEST CLIP**, 20 ampere capacity, provided with binding post for attaching wire; spread of jaws, $\frac{7}{8}$ in.18
1098. **TEST CLIP.** Same as No. 1096, but lead plated to prevent corrosion, particularly in storage battery work18
1099. **INSULATOR**, for Nos. 1096 and 1098 Test Clips, of soft rubber. Shown in phantom in the illustration06
1100. **CONNECTOR**, consists of two No. 1096 Test Clips, attached to the ends of 3 feet of flexible single lamp cord. Carrying capacity 6 amperes.70
1101. **CONNECTOR**, consists of two No. 1098 Test Clips, attached to the ends of 3 feet of flexible single lamp cord. Carrying capacity 6 amperes.70
- BATTERY JARS**, see Jars, Nos. 8040 and 8042.
- BATTERY POROUS CUPS**, see general heading Batteries.
- BEADS, Glass**, see Nos. 7126 and 7128.



BEAKERS

1124. BEAKERS, Resistance Grade, Griffin's low form, with lip.

Capacity, cc.....	30	60	90	120	150	180	250	300
Number in original case.....	216	216	156	156	156	168	168	168
Each	\$ 0.12	.12	.13	.14	.15	.16	.17	.18
Per 100 in original case.....	10.80	10.80	11.70	12.60	13.50	14.40	15.30	16.20
Capacity, cc.....	400	500	600	700	800	1000	1400	2000
Number in original case.....	84	84	72	72	48	48	24	12
Each .....	.22	.25	.26	.30	.34	.40	.55	.82
Per 100 in original case.....	19.80	22.50	23.40	27.00	30.60	36.00	49.50	73.80

1126. BEAKERS, Resistance Grade, usual tall form with lip.

Capacity, cc.....	30	60	120	180	250	350	500	700	1000	1200
Number in original case....	216	216	120	168	144	60	60	48	36	36
Each .....	.12	.12	.14	.16	.17	.21	.25	.30	.40	.50
Per 100 in original case....	10.80	10.80	12.60	14.40	15.30	18.90	22.50	27.00	36.00	45.00

1128. BEAKERS, Resistance Grade, usual tall form without lip.

Capacity, cc.....	30	60	120	180	250	350	500	700	1000	1200
Number in original case....	216	216	120	168	144	60	60	48	36	36
Each .....	.12	.12	.14	.16	.17	.21	.25	.30	.40	.50
Per 100 in original case....	10.80	10.80	12.60	14.40	15.30	18.90	22.50	27.00	36.00	45.00

1130. BEAKERS, Resistance Grade, extra tall form without lip.

Capacity, cc.....				90		180		250		350
Number in original case.....				120		144		144		72
Each .....				.13		.16		.18		.23
Per 100 in original case.....				11.70		14.40		16.20		20.70

1132. BEAKERS, Pyrex Glass, Griffin's low form, with lip.

Capacity, cc.....	50	100		150	250	400	600	800
Number in original case.....	216	156		156	168	84	72	48
Each .....	.16	.17		.19	.23	.27	.33	.38
Per dozen in original case.....	1.73	1.84		2.05	2.48	2.92	3.56	4.10
Capacity, cc.....	1000	1300		1500	2000	2500	3000	4000
Number in original case.....	48	24		24	12	12	10	10
Each .....	.54	.65		.73	.98	1.20	1.40	1.80
Per dozen in original case.....	5.83	7.02		7.88	10.58	12.96	15.12	19.44

1134. BEAKERS, Pyrex Glass, usual tall form, without lip.

Capacity, cc.....	100	150	200	300	400	500	600	800	1000
Number in original case.....	156	120	168	144	60	60	48	48	36
Each .....	.17	.19	.21	.25	.27	.29	.33	.38	.54
Per dozen in original case.....	1.84	2.05	2.27	2.70	2.92	3.13	3.56	4.10	5.83

1136. BEAKERS, Pyrex Glass, usual tall form with lip.

Capacity, cc.....	100	150	200	300	400	500	600	800	1000
Number in original case.....	156	120	168	144	60	60	48	48	36
Each .....	.17	.19	.21	.25	.27	.29	.33	.38	.54
Per dozen in original case.....	1.84	2.05	2.27	2.70	2.92	3.13	3.56	4.10	5.83

**BEAKERS, Phillips, see Flasks, Assay.****1140. BEAKERS, Sugar, heavy, with lip.**

Capacity, cc.....	175	900
Each	\$0.30	.65

1142. BEAKER, Heavy Tumbler Shaped, with pour-out, not for heating. Capacity, 8 ounces.... .25

1144. BEAKERS, Aluminum, with lip. Capacity, cc.....	125	250	500	1000
Each .....	.60	.85	1.00	1.65

1146. BEAKERS, Copper, with lip. Capacity, cc.....	125	250	500	1000
Each .....	.65	.85	1.10	1.75

1148. BEAKERS, Copper, with lip, nickel-plated for sugar analysis.

Capacity, cc.....	125	250	500	1000
Each .....	.70	.90	1.15	1.65

1150. BEAKERS, Best American Porcelain, glazed inside and outside, without lip.

No.	1	2	3	3A	4	5	6
Capacity, cc.....	165	340	580	700	970	1500	1775
Diameter of body, mm.....	52	65	78	83	93	104	110
Diameter of rim, mm.....	62	74	87	93	103	114	122
Height, mm.....	93	118	143	154	167	198	209
Each .....	.75	1.00	1.20	1.50	1.80	2.50	4.00

1152. BEAKERS, Dye Pots, Best American Porcelain, glazed inside and outside to heavy supporting rim. Without lip.

No.	A	B
Capacity, cc.....	310	1500
Diameter of body, mm.....	74	108
Diameter of rim, mm.....	79	120
Height, mm.....	123	188
Each	1.20	2.75

1156. BEAKERS, Opaque Fused Silica, Griffin's low form with lip. Capable of resisting temperatures up to about 1200°C. continuously, and unaffected by mineral or organic acids except hydrofluoric, and phosphoric at high temperatures. Alkalies in solution at low temperatures do not affect the ware, but at high temperatures or in fusions readily attack it. Its very low coefficient of expansion enables it to withstand sudden changes in temperature.

Capacity, cc.....	50	100	150	200	250	400	500	600	800
Each	1.13	1.25	1.38	1.50	1.81	2.13	2.44	2.75	3.31

1158. BEAKERS, Transparent Quartz, with lip, prepared from rock crystal. Melting point about 1600°C. Not attacked by water at room temperatures or at the boiling point. Less soluble in alkaline solutions than the best glass. Not attacked by dilute acids except hydrofluoric; concentrated sulphuric acid has no appreciable effect at 100°C.

Capacity, cc.....	25	50	100	200	250
Each	4.80	7.20	12.50	18.00	21.00



BELL JARS

All of our bell jars are made of clear glass and are well shaped. All rims are reground in our own factory, thus insuring a good contact with the pump plate, which is not possible with ordinary grinding.

1160. BELL JARS, High Straight Form, Knob Top, with reground rim.

No.	A	B	C	D	E
Height, inside, inches.....	9	11	15	15	18
Diameter, inside, inches.....	5	6	7	8½	9
Capacity, gallons	½	1	2	3	4
Each	\$1.80	2.40	3.15	4.00	5.60

1162. BELL JARS, High Straight Form, Open Top, with reground rim and top ground flat.

No.	A	B	C
Height, inside, inches.....	9	11	15
Diameter, inside, inches.....	5	6½	7
Diameter of opening, inches.....	1	1¼	1½
Capacity, gallons	½	1	2
Each	1.80	2.40	3.15

1164. BELL JAR, High Straight Form, Tubulated Top, to take No. 0 rubber stopper; with reground rim. Inside height, 11 inches; inside diameter, 6½ inches; capacity, 1 gallon.. \$2.40

1166. BELL JARS, High Straight Form, Tubulated Top, with ground-in glass stopper and reground rim.

No.	A	B	C
Height, inside, inches.....	9	11	15
Diameter, inside, inches.....	5	6	7
Capacity, gallons	½	1	2
Each	2.00	2.50	3.15

1168. BELL JARS, High Swelled Form, Knob Top, with reground rim.

No.	A	B
Height, inside, inches.....	10	12
Diameter, inside, inches.....	6	7
Capacity, gallons	1	2
Each	2.40	3.15

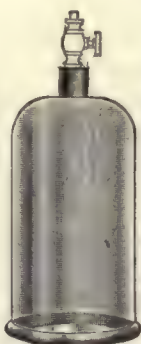
1170. BELL JAR, Extra High Form, with reground rim, for use with a full length barometer tube in studying the effect of reduced pressure on the barometric column..... —



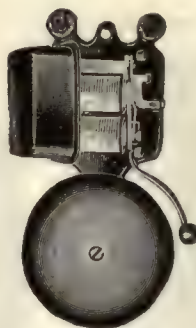
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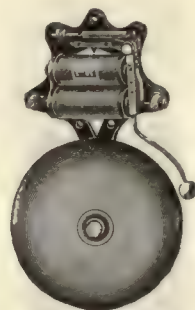
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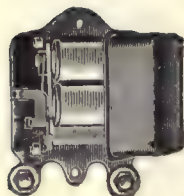
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No. 1184.



No. 1186.



No. 1188.



No. 1190.



No. 1192.



No. 1196.

1172. **BELL JARS, Low Straight Form, Knob Top, with reground rim.**

No.	A	B	C	D	E	F	G
Height, inside, inches.....	2¼	3½	4	5	8	10	11
Diameter, inside, inches.....	4	5	6	8	10	12	16
Each	\$0.90	1.30	1.85	2.60	3.70	5.35	8.10

1174. **BELL JAR, Low Swelled Form, Open Top, (Hand and Bladder Glass), both rims ground. Diameter at the bottom rim, 4¾ in.; height, 4 in. 2.25**1176. **BELL JAR, Capped. No. 1164 fitted with a brass cap for receiving either stopcock or a sliding rod. Without stopcock or rod..... 4.00**1177. **SLIDING ROD, with knob at one end and hook at the other for manipulation of apparatus inside of No. 1176 Bell Jar. Complete with packing screw, threaded 7/16-16..... 1.50**1184. **BELLS, Electric, D. C. Iron box, pivoted armature.**

No.	A	B	C
Diameter of gong, inches.....	2½	3	4
Each	\$0.50	.55	.70

1186. **BELLS, Electric, D. C., Skeleton Type. Pivoted armature, superior workmanship, nickel-plated gong giving clear, penetrating tone.**

No.	A	B	C	D
Diameter of gong, inches.....	4	6	8	10
Each	2.25	3.60	5.00	8.00

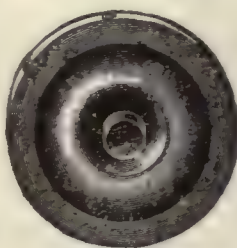
1188. **BUZZER, Electric, D. C. Iron box..... \$0.45**1190. **BELLS, Electric, A. C., so-called Transformer Bells. For use on Nos. F3879 Bell Ringing Transformers on voltages from 6 to 18. Loud-ringing dependable bells with carbon contacts, laminated field and cores, closed movement and insulated current carrying parts.**

No.	A	B	C	D
Diameter of gong, in.....	3	4	6	8
Each	4.20	4.50	10.60	13.20

For **TRANSFORMERS** for use with No. 1190, see general heading **Electrical Instruments.**1192. **BELL, Electric, loud ringing, for outside service; entirely moisture proof; operates on 110 volt, 60 cycle, A. C. 6 inch gong..... 12.90**1196. **ELECTRIC BELL OUTFIT, consisting of No. 1184A Bell, No. 964 Dry Battery, No. 1200 Push Button, 1 lb. (150 feet) annunciator wire, and staples for putting up..... 2.00**



No. 1198.



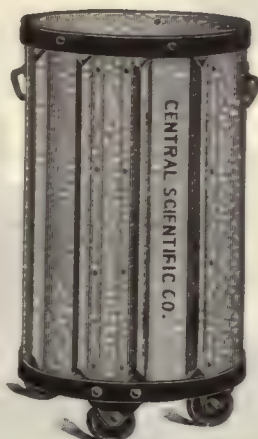
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No. 1206.



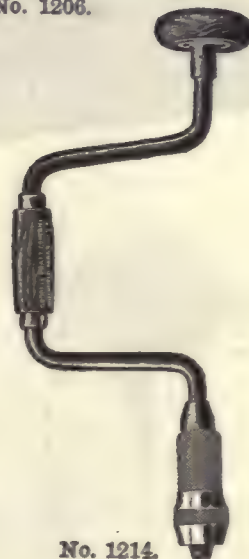
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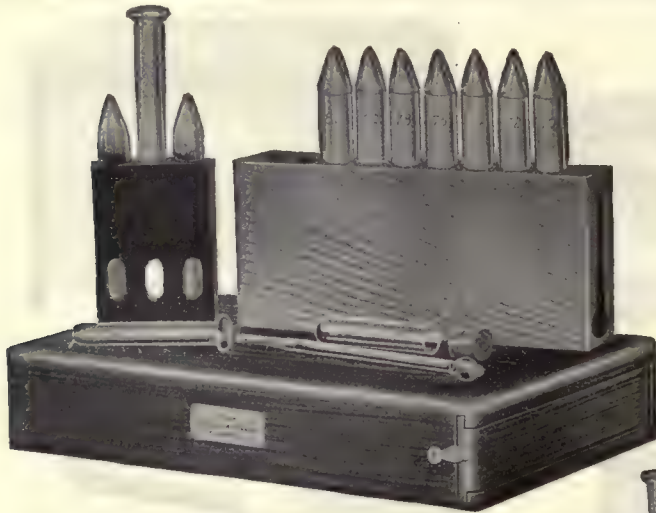


No. 1214.

1198. **PUSH BUTTON**, bronze, with screw cap..... \$0.45
 1200. **PUSH BUTTON**, pressed metal, with screw cap12
 1202. **STAPLES**, Wire, square top, $\frac{3}{8}$ -inch, for bell wiring. In 4-oz. packages.... Per package .11
BELLOWS, Hand, see No. 1380.

BINS and CONTAINERS

1206. **BIN or Container**, strongly made of heavy galvanized steel with hinged cover and with angle steel reinforcements and legs, the bottom of the can being 4 inches from the floor. Size 22 inches by 30 inches high..... 24.00
1208. **BINS or Containers**, made of galvanized iron, air and water-tight, with outside fitting cover; has a heavy steel band top and bottom, the lower one riveted through body and bottom; concave bottom raised $1\frac{1}{4}$ inches from ground; drop handles.
- | No. | A | B | C |
|------------------------|----------------------|-------|-------|
| Size, inches..... | 14 $\frac{1}{2}$ x24 | 16x26 | 19x28 |
| Capacity, gallons..... | 17 | 22 | 32 |
| Each | 5.40 | 6.00 | 7.20 |
1210. **BINS or Containers**, of galvanized steel fitted with wheels and handles for wheeling about. Very convenient in transporting soils or grains from one part of the laboratory to another. With cover.
- | No. | A | B |
|------------------------|-------|-------|
| Size, inches..... | 16x26 | 19x28 |
| Capacity, gallons..... | 22 | 32 |
| Each | 8.00 | 9.60 |
1212. **BIN or Container**, of heavy galvanized iron, with handles and cover; will hold half-bushel of soil or grain..... 1.60
1214. **BIT BRACE**, Plain, malleable iron socket and shell, forged steel jaws, 8-inch sweep..... 2.50
1216. **BIT BRACE**, Ratchet, with ball bearing head. Ratchet design is new and unique; the pawls are strong and positive in action; 8-inch sweep..... 3.75
- F1931. **BLADDER**, prepared and cleaned. For use with bladder glasses to show bursting by atmospheric pressure11



No. 1220.



No. 1222.



No. 1223A.



No. 1221.

BLOOD TESTING APPARATUS

ABDERHALDEN REAGENTS

1219A. NINHYDRIN (Triketohydrindene hydrate).....per $\frac{1}{10}$ gram vial \$1.75

1219B. SILK PEPTONE, Hoechst.....per gram .65

1220. ALKALI RESERVE DETERMINATION OUTFIT for blood plasma, consisting of nine sealed tubes of resistance glass containing standardized phosphate solutions colored with phenolsulphonphthalein, numbered from 7.0 to 8.6 by 0.2; one non-soluble dialyzing tube; one tube for making dialyzing sacs; one tube for aeration; one capillary nozzle tube; and 100 cc of phenol-sulphonphthalein in .08 per cent. sodium chloride indicator solution. Complete in wooden pocket case with directions for use. (See Archives of Internal Medicine for June 1916) 6.00

1220A. DIALYZING TUBES only of No. 1220.....per dozen .60

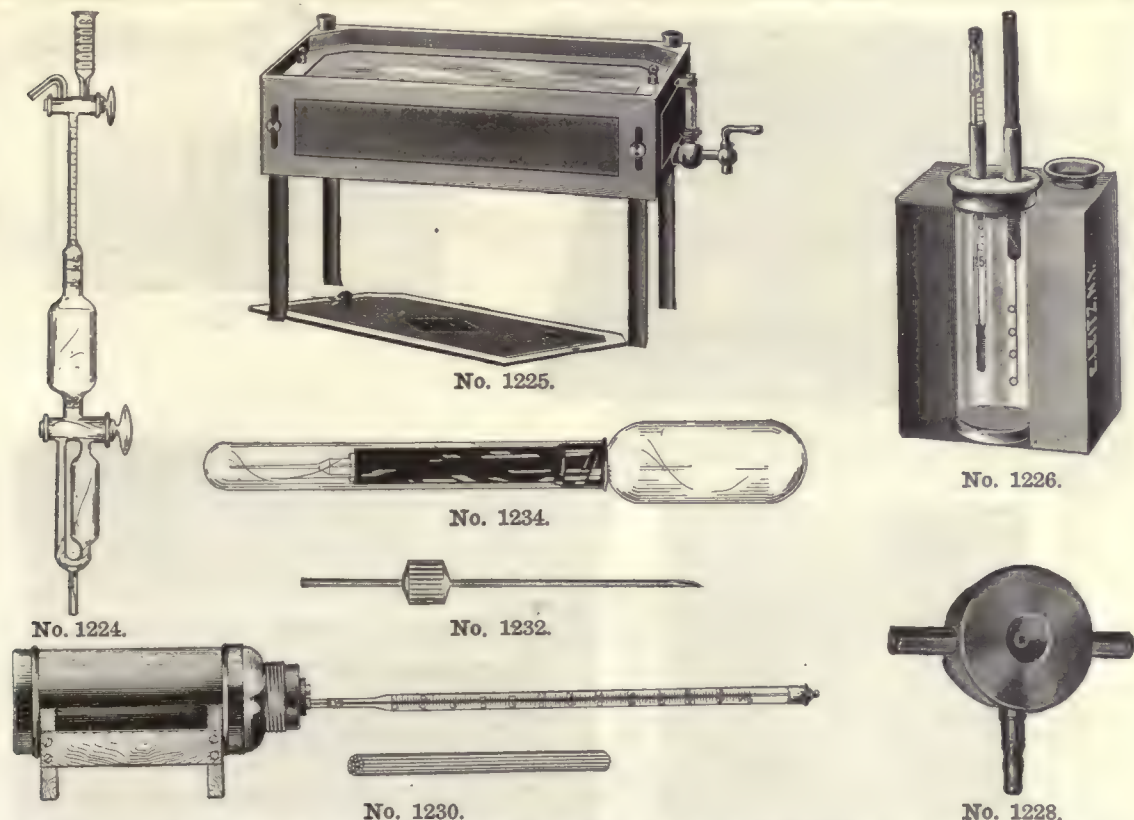
1220B. GLASS TUBES only of No. 1220, for making the dialyzing sacs.....per dozen .72

1221. ALVEOLAR AIR TESTING OUTFIT, consisting of a set of 8 sealed glass tubes of resistance glass containing standardized phosphate solution colored with phenolsulphonphthalein and numbered from 10 to 45 mm by 5 mm; one long non-soluble glass test tube; one non-soluble glass capillary nozzle; one metallic comparison box to hold the specimen and two color tubes; one 1000 cc rubber bag; one rubber bulb; one pinchcock; one glass mouthpiece; and 100 cc of standardized sodium bicarbonate indicator solution, in wooden pocket case with directions for use. (See Journal of American Medical Association Vol. LXVI, pages 1594-1596, for May 20, 1916).....7.80

1222. CAPSULES, Wright's, for collecting small amounts of blood, which may then be sealed until required for use.....per dozen .30

1223. CARBON DIOXIDE APPARATUS, Fredericia, for the determination of the percentage of carbon dioxide in alveolar air as an indication of acidosis of the blood. A simple device for the collection of the alveolar air and the direct estimation of the carbon dioxide percentage without the use of more elaborate gas analysis apparatus. Complete as illustrated, mounted on fiber board support. (See J. J. R. Macleod, Journal of Laboratory and Clinical Medicine for April 1916).....17.00

1223A. GLASS PARTS only of No. 1223.....12.00



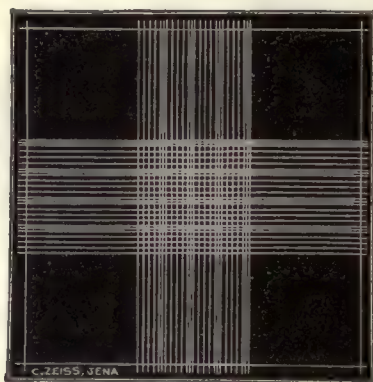
1224. **CARBON DIOXIDE APPARATUS**, Van Slyke, for the determination of carbon dioxide and carbonates in blood plasma and other solutions, designed by Dr. Donald D. Van Slyke of the Rockefeller Institute for Medical Research. With this apparatus, a determination requires only a few minutes for completion and may be made with 1 cc or less of blood plasma. With upper part of pipette graduated to 1 cc in 0.02 cc divisions. Complete on stand with leveling bulb and connecting tube, separatory funnel, two glass pipettes and with directions for use. (See Journal of Biological Chemistry, Vol. XXX, No. 2, for June 1917, page 347)..... \$21.00
- 1224A. **GLASS PARTS** only of No. 1224..... 15.00
- CENTRIFUGES** for Blood Testing, see general heading **Centrifuges**.
1225. **COAGULATORS** for Blood Serum, or Inspissators, of copper, double walled, heavily tinned on the inside. The outside is covered with insulating material and the top with heavy felt. Supported on four legs, the two in front being adjustable in height for tilting at any desired angle. Complete with water level, drip cock and tubulatures for thermometer and thermometer regulator.
- | No. | A | B | C |
|----------------------------|-------|-------|-------|
| Length inside, inches..... | 12 | 16 | 16 |
| Width inside, inches..... | 10 | 8 | 14 |
| Depth inside, inches..... | 2½ | 2½ | 2½ |
| Each..... | 30.00 | 33.00 | 38.00 |
1226. **COAGULOMETER**, Biffi-Brooks, for the coagulation test of blood. Requires but a few moments for the determination, is accurate and readily portable. With thermometer and directions for use..... 8.00
1228. **COAGULOMETER**, Brodie-Russell-Boggs, for use on the microscope stage for determining the exact time for coagulation of the blood. (See Johns Hopkins Hospital Bulletin for June-July, 1907)..... 9.50
1230. **COAGULOMETER**, Rudolf's, consisting of a pint Thermos bottle, with a three-hole rubber stopper. Through two holes are brass tubes 7 inches long, in which are inserted thin glass tubes 1.5 mm in diameter and about 7 inches long, each containing blood from the same drop. The outer ends of the tubes are sealed with a flame. A thermometer is placed in the third hole of the stopper. Complete with wooden support for Thermos bottle. (See American Journal of the Medical Sciences for 1910, Vol. CXL, page 807; 1911, Vol. CXLII, page 481).... 9.50
1232. **COLLECTING NEEDLES**, Wassermann, for obtaining blood for investigation. With knurled finger grip to facilitate insertion.....Each .15
Per dozen 1.50
1234. **COLLECTING TUBES**, Keidel's Vacuum, consisting of a 5 cc bulb, drawn out to a capillary tip and sealed after a vacuum has been created by heating, a 25 gage hose-hub needle, a piece of rubber tubing for connecting needle and bulb and a glass tube for protection during sterilization. Complete as illustrated.....Each .25



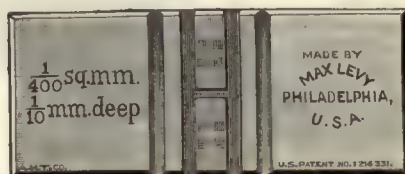
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No. 1250.



Thoma Ruling.



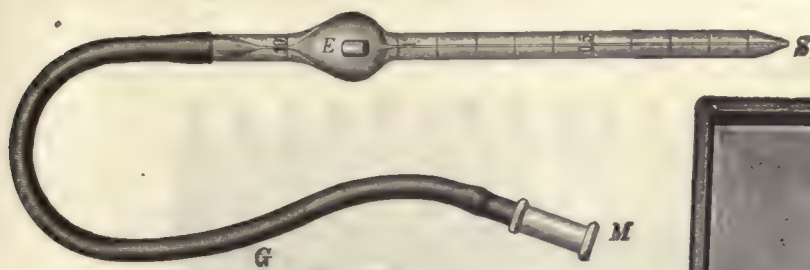
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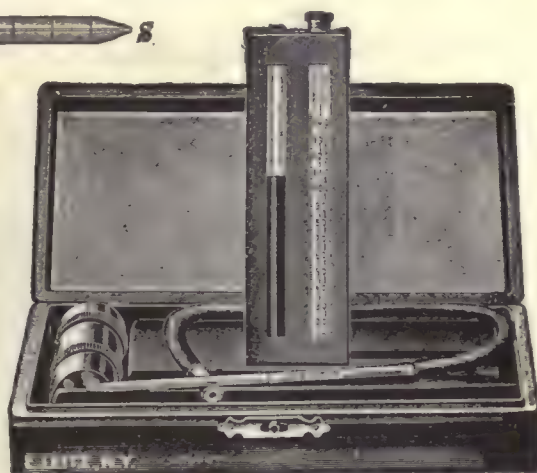
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COLORIMETERS for Blood Testing, see general heading **Colorimeters**.

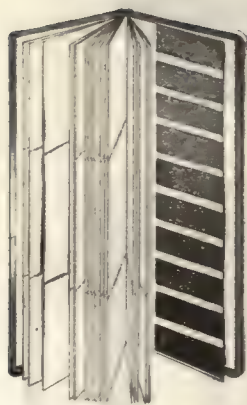
1236. **CULTURE TUBE**, Keidel Vacuum, for Blood, modified by Judd and Simon for culture work. Consists of a tube with a capacity of 50 cc drawn out to a capillary tip, into which is introduced 15 to 25 cc of glucose bouillon containing 1.5 cc of sodium citrate. The tube is then exhausted and sealed. Complete with a 24 gage hose-hub needle with stylet, heavy walled rubber connecting tubing, and a glass tube for protection during sterilization, filled and sealed ready for use..... \$0.75
1246. **HAEMACYTOMETER**, Fuchs-Rosenthal, for cytological investigations of the cerebro-spinal fluids, with counting chamber 0.2 mm deep, with two cover glasses and one mixing pipette for white corpuscles, in leather case..... 10.00
1247. **COUNTING CHAMBER** only of No. 1246, with two cover glasses; without case..... 6.00
1250. **HAEMACYTOMETER**, Levy, Bürker-Neubauer, with Bürker double counting chamber with two Neubauer rulings, complete with two cover glasses, one pipette for red and one for white corpuscles, in leather case.
- This new type of counting chamber (patented) differs from the old Bürker chamber in that a depression is cut into the slide itself, instead of having two parallel pieces of glass cemented on the slide across its entire width, thus doing away with the danger of loosening of the sides of the cell with the drying out of the balsam cement. In the center of this depression are permanently fixed two rectangular pieces of glass, separated by a small moat, each ruled with the Neubauer ruling. The surfaces of these rectangles are exactly $\frac{1}{10}$ th millimeter below that of the slide, thus providing a solution over the ruled area of the correct depth when the slide is in place. The double chamber enables both red and white corpuscles to be counted at the same time, without cleaning and refilling the counting chamber.. 18.00
1251. **COUNTING CHAMBER** only of No. 1250, with two cover glasses; without case..... 10.00
1252. **COVER GLASS** only of No. 1250, size 20x26 mmx0.5 mm thick..... .30
1253. **HAEMACYTOMETER**, Levy, Bürker-Neubauer, same as No. 1250, but with Bureau of Standards certificate for counting chamber and pipettes..... 24.00
1254. **HAEMACYTOMETER**, Thoma, with counting chamber with original Thoma ruling, two cover glasses, one pipette for red and one for white corpuscles, in leather case..... 12.00
1255. **COUNTING CHAMBER** only of No. 1254 with two cover glasses; without case..... 6.00
1258. **HAEMACYTOMETER**, Türk, with counting chamber with Türk ruling, two cover glasses, one pipette for red and one for white corpuscles, in leather case..... 13.50
1259. **COUNTING CHAMBER** only of No. 1258, with two cover glasses, without case..... 7.50



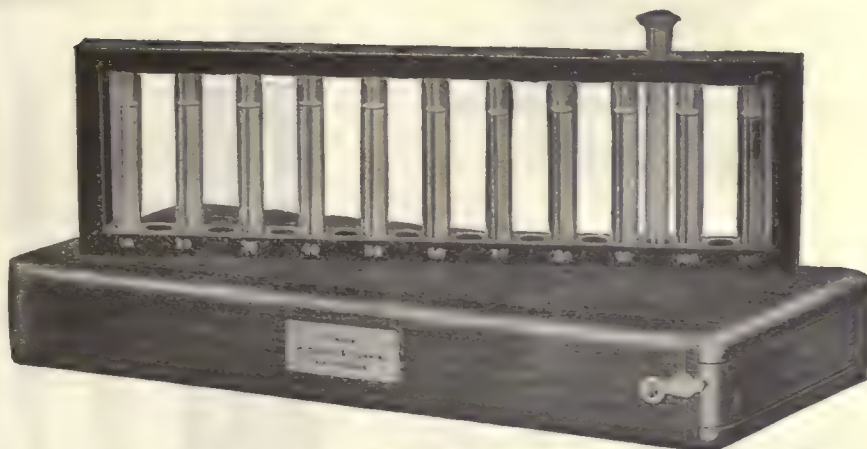
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No. 1280.

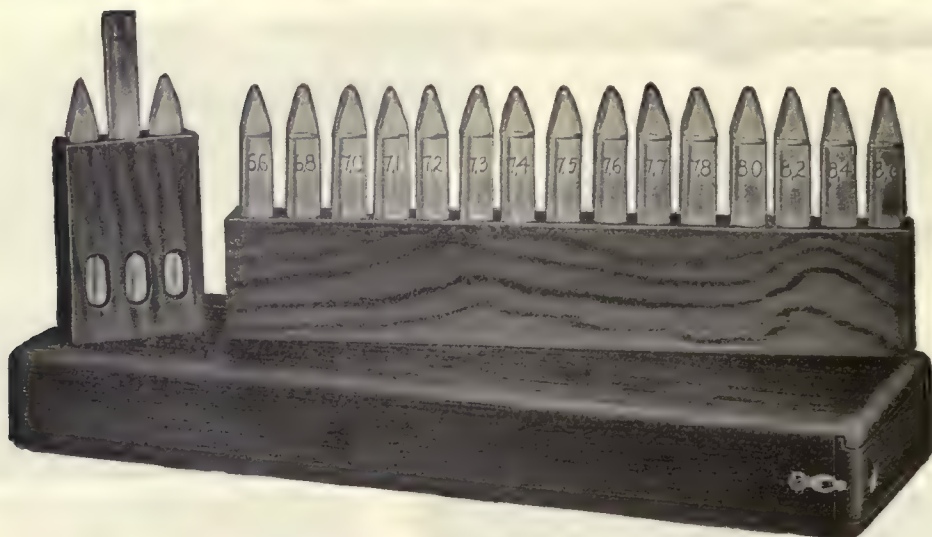


No. 1278.



No. 1277.

1262. **HAEMACYTOMETER**, Zappert-Ewing, with counting chamber with Zappert-Ewing ruling, two cover glasses, one pipette for red and one for white corpuscles, in leather case..... \$13.50
1263. **COUNTING CHAMBER** only of No. 1262, with two cover glasses; without case..... 7.50
1266. **MIXING PIPETTE**, Thoma, for red corpuscles, for dilution in the ratio of 1 to 100, with rubber tubing and mouthpiece..... 2.00
1267. **MIXING PIPETTE**, Thoma, for white corpuscles, for dilution in the ratio of 1 to 10, with rubber tubing and mouthpiece..... 2.00
1270. **COVER GLASS** for Counting Chamber, square, polished, 0.4 mm thick..... .50
1272. **CASE** for Counting Chamber, of leather, velvet lined 1.00
1273. **CASE** for Complete Haemacytometer, of leather, velvet lined..... 2.40
- HAEMATOCRIT**, Daland, see *Centrifuge Accessories*.
1277. **HAEMOGLOBINOMETER**, Haessler - Newcomer, for rapidly and accurately estimating haemoglobin in blood. The outfit consists of an open tube for the specimen under test, together with 11 sealed color tubes containing stable artificial color standards, graded in multiples of ten. These standards are mounted in a hardwood rack with holes between them for the insertion of the specimen tube. By the use of the interrupted series of standards, the color may be more easily and accurately matched than with a uniformly graded scale. Complete as described with specimen tube and color standards in hardwood carrying case. (See Archives of Internal Medicine for June 1916, pages 806-808)..... 7.20
1278. **HAEMOGLOBINOMETER**, Tallquist, consisting of a color scale of 10 tints, ranging from 10% to 100%, bound in book form, pocket size, with 50 sheets of absorbent paper sufficient for 150 tests. With directions for use..... 1.75
1280. **HAEMOMETER**, Sahli, with Kuttner Haemoglobin Standard, the color of which maintains its permanency. Complete with carefully calibrated and tested color tube and pipette, hard rubber stand for tubes, and hard rubber container for blood specimen with vial and rubber stopper, in case with directions for use..... 7.00
1281. **HAEMOGLOBIN STANDARD**, Kuttner, for No. 1280 2.00
1282. **GRADUATED TUBE**, 140 cmm, for No. 1280..... 1.50
1283. **GRADUATED PIPETTE**, 20 cmm, for No. 1280..... 1.00



No. 1286.



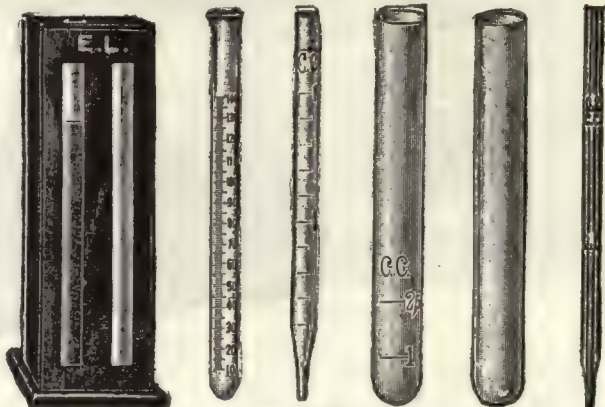
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No. 1292.

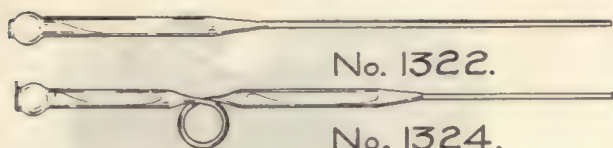


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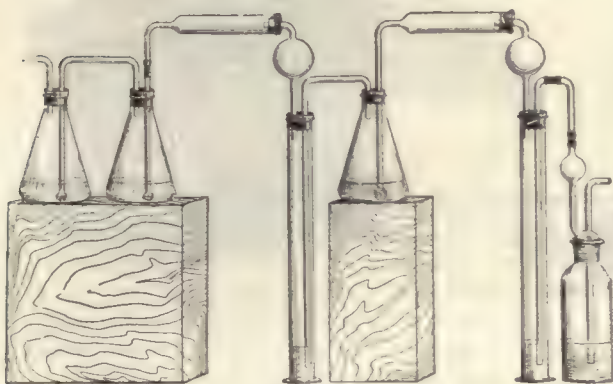
No. 1308.

1286. **HYDROGEN-ION CONCENTRATION APPARATUS** for determining the hydrogen-ion content of the blood colorimetrically, as suggested by Drs. Levy, Rountree and Marriott. The outfit consists of a series of standard colored liquids sealed in glass tubes, a wooden holder for the tubes and a comparison box for matching the color of the unknown with the standard colors. Complete in wooden case $1\frac{3}{8} \times 4 \times 11\frac{1}{2}$ inches. (See Archives of Internal Medicine, Vol. XVI, for September 1915, page 389)..... \$5.50
1290. **LANCET, Blood**, with nickel-plated metal handle into which the lancet can be screwed for protection60
1292. **LANCET, Blood**, same as No. 1290, but with hard rubber handle..... .45
1296. **LANCET, Blood, Spring**, in nickel-plated handle with spring clamp, and screw to adjust depth 3.00
- MICROSCOPES for Blood Testing**, see general heading **Microscopes**.
1308. **MICRO-SACCHARIMETER**, Epstein's, for the estimation of sugar in the blood, making use of the color change brought about by heating a mixture of sugar and picric acid in the presence of sodium carbonate, the depth of the color depending on the amount of sugar present. With this apparatus an accurate determination may be made with as small an amount as 0.1 cc of blood. Complete with two standard color tubes, an accurately graduated tube for the unknown, holder with opaque glass slide for the color tubes, pipette graduated to 1 cc in 0.1 cc divisions, capillary pipette graduated at 0.1 and 0.2 cc, tube graduated at 1 and 2.5 cc, two boiling tubes with holder, filtering funnel, dropper, and set of three solutions—picric acid, sodium carbonate, and sodium fluoride, in case with directions for use..... 9.00
1309. **STANDARD COLOR TUBES**.
- | | | |
|------------|------|------|
| No. | A | B |
| Each | 1.00 | 1.00 |
1310. **GRADUATED TUBE**, for blood serum..... 1.00

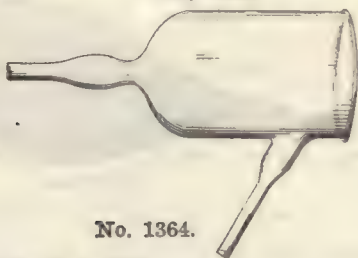


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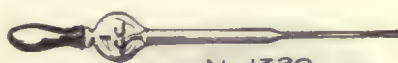
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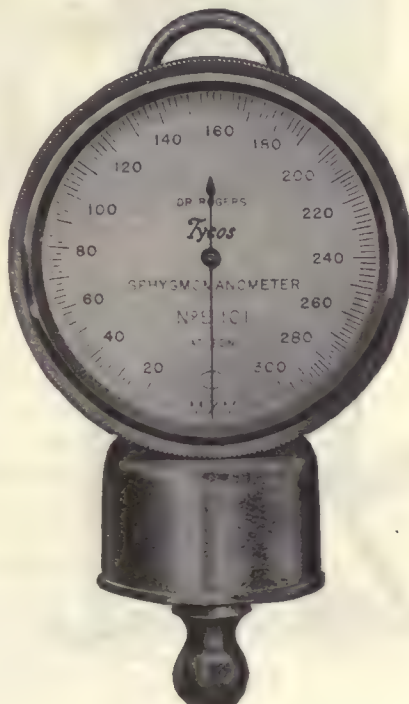
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No. 1364.



No. 1320.

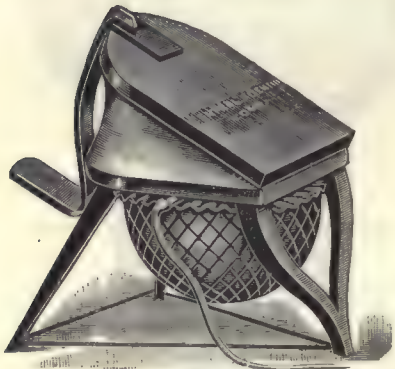


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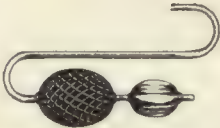
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|-------|--|----------|
| 1311. | BOILING TUBE | \$0.05 |
| 1312. | TUBE , graduated at two marks, 1 and 2.5 cc..... | .25 |
| 1313. | PIPETTE , with two marks, 0.1 and 0.2 cc, with rubber tube and mouth-piece..... | .50 |
| | PIPETTE , Mohr's, 1 cc in $\frac{1}{10}$, graduated to the tip, see No. 10496. | |
| | FUNNEL , Filtering, see No. 6112. | |
| | DROPPER , see No. 10476. | |
| 1314. | PICRIC ACID SOLUTION , saturated, 125 cc in glass stoppered bottle..... | .75 |
| 1315. | SODIUM CARBONATE , 10% solution, 125 cc in glass stoppered bottle..... | .25 |
| 1316. | SODIUM FLUORIDE , 2% solution, 30 cc in glass stoppered bottle..... | .40 |
| | NEEDLES , Blood, see Lancets. | |
| 1320 | PIPETTE , Comer Automatic, for vaccines, etc., designed to deliver exactly 1 cc, with reservoir to hold excess..... | 1.00 |
| | PIPETTES , Wassermann, see No. 10506. | |
| 1322. | PIPETTE , Wright's Blood, of soft glass with end shaped to take rubber tube, and with point carefully drawn to capillary tip. Length over all, $7\frac{1}{2}$ inches..... | .20 |
| 1324. | PIPETTE , Wright's Looped, for use in measuring the bactericidal power of the blood.... | .50 |
| | SPECTROSCOPES for Blood, see general heading Spectroscopes . | |
| 1346. | SPHYGMOMANOMETER , Roger's Tycos Aneroid, complete with indicator, patent arm sleeve and inflating bulb with control valve, in morocco carrying case, $5\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{4}$ inches, with directions for use..... | 25.00 |
| | SYRINGES for Blood Testing, see general heading Syringes . | |
| 1354. | UREA APPARATUS , Marshall's for Blood, consisting of three 200 cc Erlenmeyer flasks with two-hole rubber stoppers, two glass cylinders 12x2 inches with two-hole rubber stoppers, one Drechsel gas washing bottle, two calcium chloride tubes with one-hole rubber stoppers, one No. 5476A Filter Pump, three special Folin absorption tubes, with necessary connecting tubes of glass and rubber, complete as illustrated, without supports. (See Journal of Biological Chemistry, Vol. XV, No. 3, for September 1915) | 6.00 |
| 1355. | FOLIN TUBES only of No. 1354, with perforated bulbs | each .30 |
| 1356. | BULB CONNECTING TUBES only of No. 1354 | each .30 |
| 1357. | GLASS CONNECTING TUBES only of No. 1354, L shape, long, for use in cylinders..... | each .10 |
| 1358. | GLASS CONNECTING TUBES , L shape, short, for connecting flasks of No. 1354...each | .10 |
| | WASSERMANN BATHS , see Water Baths. | |
| | WASSERMANN PIPETTES , see Pipettes No. 10506. | |
| | WASSERMANN TUBES , see Test Tubes No. 13390. | |
| 1364. | WET CUP , Blackfan, of glass, for procuring blood from children..... | 2.00 |



No. 1374.



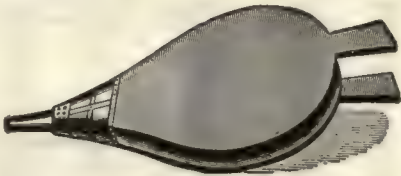
No. 1376.



No. 1382.



No. 1388.



No. 1380.

BLOWERS

1374. **BLOWERS, Foot, Fletcher's**, portable; give a steady and powerful blast.

No.	9	9A	9B
Diameter of air reservoir, inches.....	7¼	9	11
Pressure obtainable, per inch, pounds.....	1	1½	1¾
Capacity, per hour, cubic feet.....	190	330	625
Each	\$7.50	9.90	14.60

1376. **BLOWERS, Foot, Fletcher's**, mounted on legs with rubber reservoir underneath, thus obviating the risk of injury. Specifications are same as given under No. 1374.

No.	10	10A	10B
Each	8.70	11.40	17.40

1377. **RUBBER DISKS** for Nos. 1374 and 1376 Blowers.

Adapted to Nos.....	9 & 10	9A & 10A	9B & 10B
Diameter, inches	9⅞	11½	14¼
Each .....	.40	.70	1.00

1378. **NETS** for Nos. 1374 and 1376 Blowers.....Each .45

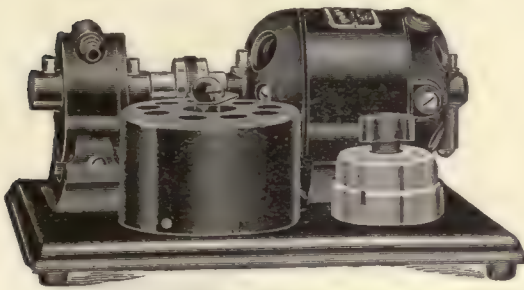
1380. **BLOWER, Hand Bellows**, 7 inches in diameter90

1382. **BLOWER, Hand**, of rubber, two bulbs, one covered with net for constant pressure..... 1.00

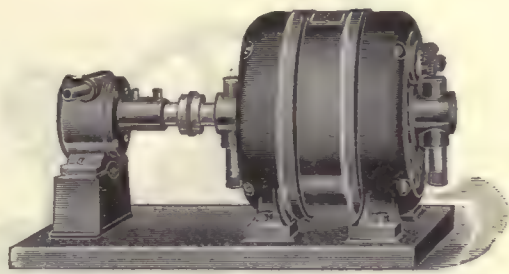
BLOWERS FOR POWER USE

1388. **BLOWERS, Hot Air**, electrically operated, for producing a constant stream of hot air; useful for quickly drying glassware such as large flasks, etc., also for promoting evaporations. Complete with double switch, one for blast at room temperatures, the other for hot air, and with cord and plug for attaching to lamp-socket.

No.	A	B	C	D
	A.C.		D.C.	
For voltage.....	110	220	110	220
Each	17.50	18.25	17.50	18.25



No. 1398.



No. 1400.

1398. **BLOWER AND VACUUM PUMPS, Cenco Rotary, Electrically Driven**, for producing a blast for the operation of blast lamps and for use with other laboratory devices requiring moderate air pressure or vacuum. The blowers are of small size, very compact, and with few parts. They are free from mechanical troubles and require practically no attention, except an occasional oiling. They are mounted on a cast iron base, direct connected to an electric motor, and are connected with a variable rheostat by means of which the speed and therefore the air pressure can be varied. A snap switch is mounted on the same base for starting and stopping the motor.

Specifications:—

Size of base, $8\frac{3}{4} \times 8$ inches.
 Height over all, $4\frac{1}{4}$ inches.
 Range of speed, 600 to 2000 r. p. m.
 Pressure at maximum speed, 8 pounds per square inch.
 Cubic feet of air per minute, 0.75.

Number of blast lamps operated simultaneously, 2.
 Vacuum at maximum speed, 17 inches of mercury.
 Power consumption, 50 watts.

Complete as described with blower, motor, rheostat and snap-switch mounted on base with 5 feet of cord and plug for attachment to any lamp socket.

No.	A	B	C	D
	A.C.		D.C.	
For volts	110	220	110	220
Each	\$40.00	45.00	40.00	45.00

1399. **BLOWER AND VACUUM PUMP** only of No. 1398, with grooved pulley, but without base, motor or other accessories 12.00
1400. **BLOWER AND VACUUM PUMPS, Cenco Rotary, Electrically Driven**, similar to No. 1398, but of larger size and capacity, with constant speed motor.

Specifications:—

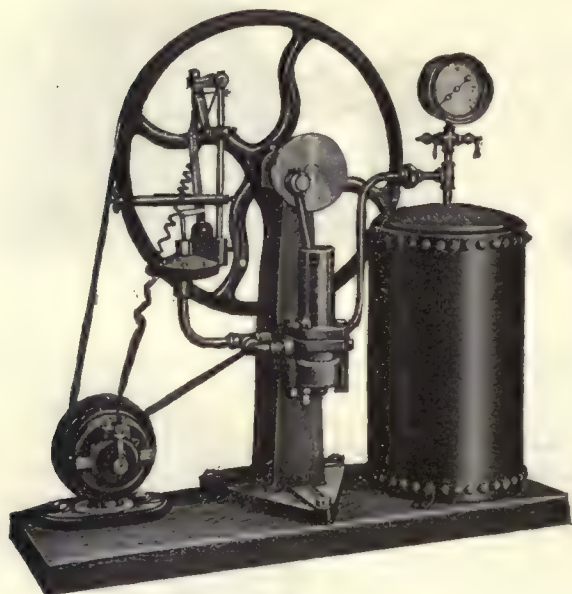
Size of base, $13 \times 7\frac{3}{4}$ inches.
 Height over all, $7\frac{1}{2}$ inches.
 Speed, 1725 r. p. m.
 Pressure, 10 pounds per square inch.
 Cubic feet of air per minute, 1.4.

Number of blast lamps operated simultaneously, 4.
 Vacuum, 20 inches of mercury.
 Power consumption, 175 watts.

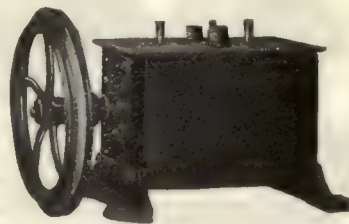
Complete as described, with blower and $\frac{1}{8}$ h. p. direct connected motor mounted on cast iron base, but without rheostat, switch, or connecting cord.

No.	A	B	C	D
	A.C.		D.C.	
For volts	110	220	110	220
Each	60.00	62.50	50.00	52.50

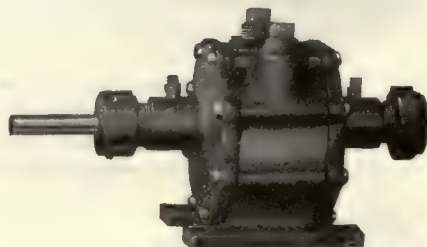
1401. **BLOWER AND VACUUM PUMP**, only of No. 1400, with grooved pulley, but without base or motor. 15.00



No. 1390.



No. 1402.



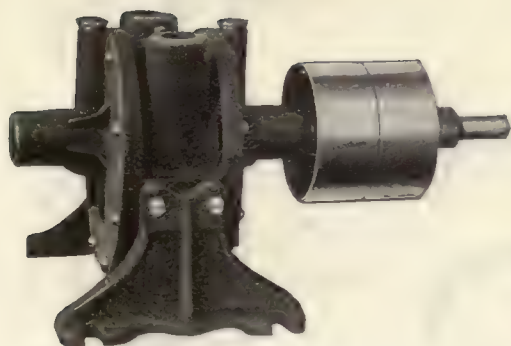
No. 1403.

1390. **BLOWER, Automatic Electric Air Compressor and Exhaust Pump Combined.** Provided with switch for automatic starting and stopping of the motor at variations of pressure. This switch operates only when the pump is used for pressure and the tank is connected only with the pressure outlet of the pump. Suction is obtained by attaching a tube to a hose nipple at the base of the cylinder. Complete with four gallon tank, pressure gage and motor compactly mounted on one base, 9½x32 in.

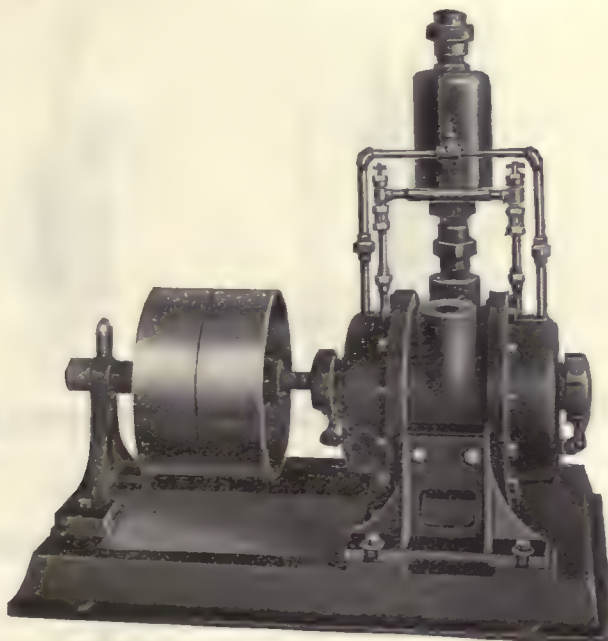
Bore, in.	1⅝	For pressure up to, lbs.....	40
Stroke, in.	2½	Vacuum up to, in.....	26
Free air per minute at 200 r. p. m.,		Height over all, in.....	25½
cu. ft.	1½	Weight, lbs.	92

No.	A	B	C
For volts	110 A.C.	110 D. C.	220 D.C.
Size of motor, h. p.....	⅙	⅙	⅙
Each	\$89.00	75.00	77.00

1396. **TANK**, of heavy galvanized iron, 12 gallons capacity, with 50 lb. pressure gauge, petcock on upper end and two ½ in. iron pipe size bushings in the side for making connections. Dimensions over all, diameter 12 in.; height, 30 in. 10.00
1402. **BLOWER and VACUUM PUMP, Crowell Rotary (No. 0-D).** This pump is used principally for vacuum work, giving from 29 to 30 in. of mercury, according to atmospheric conditions. It is fitted in an oil immersion box, which makes it practically leak-proof. Capacity about 2 cu. ft. of free air per minute. Inlet and outlet tapped for ½ in. pipe size. Requires about ¼ h. p. to operate 65.00
1403. **BLOWER and VACUUM PUMP, Crowell Rotary.** Same as No. 1402, but without the oil immersion box 52.00



No. 1406 (3-A & 4-A).



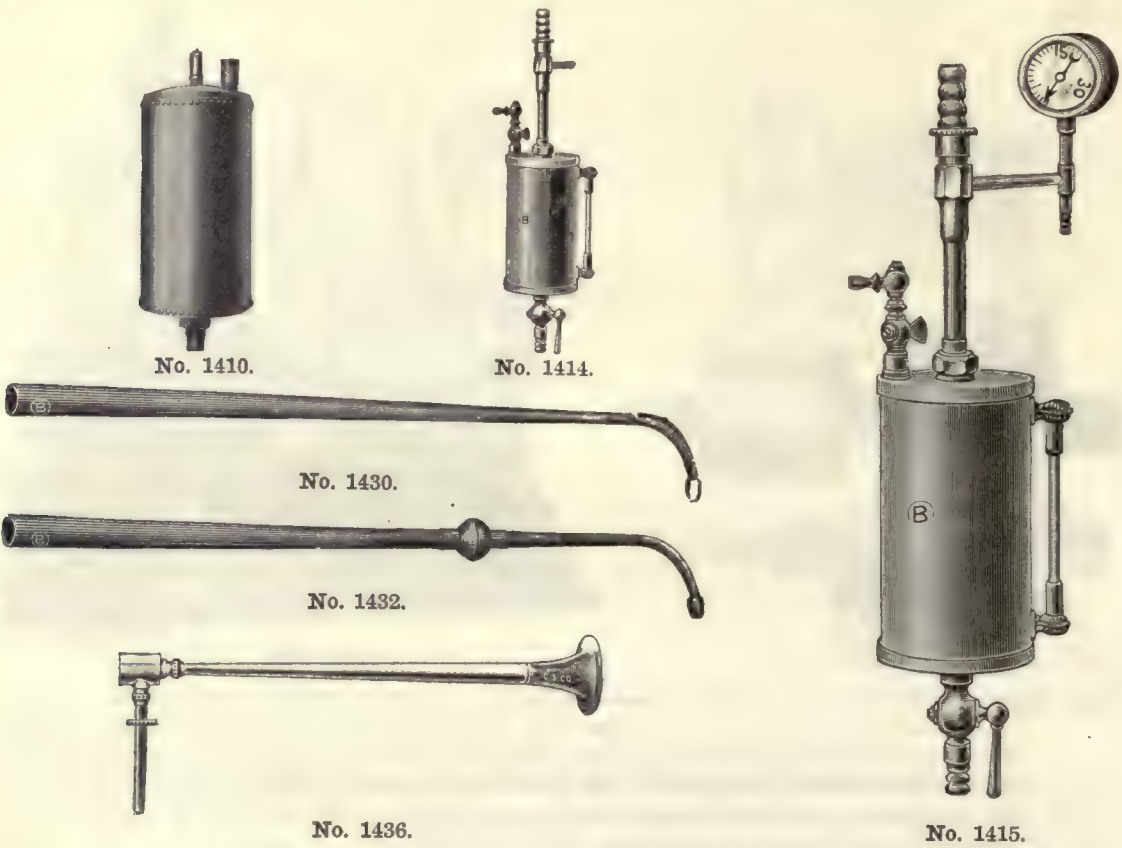
No. 1408.

- 1406. BLOWER and VACUUM PUMPS, Crowell Type A.** Adapted for all purposes requiring air under pressure of from 1 to 10 lbs. to the square inch and any degree of vacuum not exceeding 24 in. The pressure is not dependent upon high speed or centrifugal force. There are no springs, gears, valves or unbalanced parts. Satisfactory for furnishing vacuum or pressure throughout the laboratory. Air receivers are usually not required, but are of advantage where a close regulation of the pressure is desirable. (See No. 1410.)

No.	1-A	2-A	3-A	4-A	5-A
Cu. in. free air per revolution.....	20	45	125	280	460
Cu. ft. free air per min. at maximum speed	6.9	13	25.3	40.5	53.2
R. p. m. at maximum speed.....	600	500	350	250	200
Approx. h. p. at 3 lbs. pressure.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	1 $\frac{1}{2}$
Pulleys, in.	4x1	4x1 $\frac{1}{2}$	6x2 $\frac{1}{2}$	9x3	10x3
Net weight, lbs.....	24	34	90	170	225
Pipe size, inlet and outlet, in.....	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2
Floor space, in.	10x6 $\frac{1}{4}$	12 $\frac{1}{2}$ x6 $\frac{1}{2}$	22x14	28x17	34x20
Each, without air receiver.....	\$26.00	34.00	53.00	60.00	100.00

- 1408. BLOWER and VACUUM PUMPS, Crowell Type D.** For pressures up to 25 lbs. per square inch and vacua from 29 to 30 in. of mercury. The system of lubrication is positive and automatically controlled by the air pressure. The heads are provided with water jackets for cooling. Construction throughout is heavier than Type A, adapting this type for heavier duty. (For Air Receivers see No. 1410.)

No.	1-D	2-D	3-D	4-D	5-D
Cu. in. free air per revolution.....	15	40	100	280	400
Cu. ft. free air per minute at maximum speed	4.3	9.2	17	40.5	45
R. p. m. at maximum speed.....	500	400	300	250	200
Approx. h. p. at 15 lb. pressure or 29 in. vacuum	$\frac{1}{2}$	1	2	4	5
Pulleys, in.	6x2	8x2	12x4	14x4	18x6
Approx. net weight, lbs.....	70	115	250	425	580
Pipe size, inlet and outlet, in.....	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2
Floor space, in.....	13x18	14x22	19x34	23x38	26x44
Each, without air receiver.....	75.00	88.00	118.00	198.00	225.00



1410. **AIR RECEIVERS** for Nos. 1406 and 1408, which can be set to blow off at any desired pressure by turning the adjusting nut.

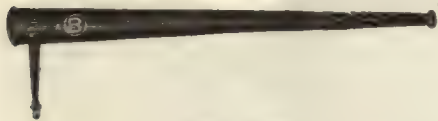
No.	1	2	3	4	5
For Blower No.	1-A or D	2-A or D	3-A or D	4-A or D	5-A or D
Height, inches	12	12	20	24	24
Length, over all, inches	18	18	26	30	32
Diameter, inches	8	8	10	10	12
Capacity, gallons	2.6	2.6	6.8	8	11.7
Net weight, lbs.	15	15	28	32	35
Pipe size, inlet and outlet, inches	1½	¾	1	1½	2
Each	\$12.00	12.00	14.50	16.50	20.00

BLOWERS OPERATED BY WATER PRESSURE

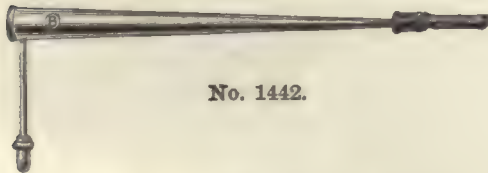
1414. **BLOWER, Muencke's**, operated by water blast for either compressing or exhausting. With 30 pounds pressure it will run two ordinary sized blast lamps. Intended for connecting to water supply by rubber tubing. Complete with one Filter Pump No. 5476, zinc water chamber 4x8 inches, air outlet and stopcock for regulation..... 12.50
1415. **BLOWER, Muencke's**, same as No. 1414 but with vacuum gage to indicate amount of vacuum 20.00

BLOWPIPES

1430. **BLOWPIPES**, of brass, plain.
- | | | | |
|----------------|-----|-----|-----|
| Length, inches | 8 | 10 | 12 |
| Each | .20 | .25 | .30 |
1432. **BLOWPIPES**, of brass, with air chamber.
- | | | | |
|----------------|-----|-----|-----|
| Length, inches | 8 | 10 | 12 |
| Each | .35 | .45 | .50 |
1433. **BLOWPIPE MOUTHPIECE**, of wood to fit blowpipes Nos. 1430 and 1432..... Each .15
Per dozen 1.50
1436. **BLOWPIPE, Berzelius Form**, of brass, with hard rubber mouthpiece and platinum plate placed on end of jet. Can be taken apart..... 2.50



No. 1438.



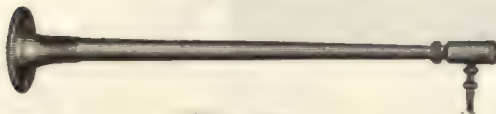
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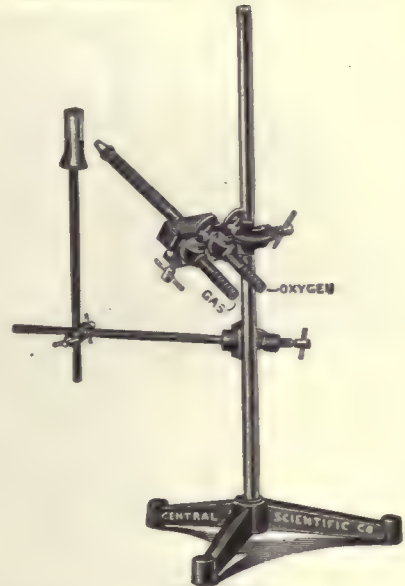
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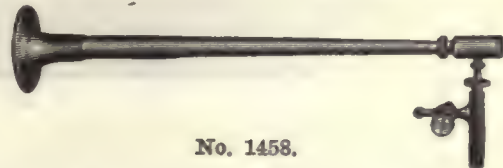
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No. 1448.



No. 1450.



No. 1458.

- | | | |
|-------|--|----------------|
| 1438. | BLOWPIPE, Black's, japanned tin, removable brass tip. Length, 8½ inches..... | \$0.20 |
| 1439. | BLOWPIPE TIPS for No. 1438..... | Per dozen 1.00 |
| 1442. | BLOWPIPE, Black's, new form, of brass, with removable tip that unscrews and wooden mouth-piece. Length, 9½ inches..... | .70 |
| 1444. | BLOWPIPE, Brazing, of brass with stopcocks for air and gas. Requires ⅜ inch gas supply. Size of air tube, ⅜ inch; of gas tube, ⅜ inch; length over all, 14 inches..... | 3.00 |
| 1446. | BLOWPIPE, Fletcher's Hot Blast, of brass. Length, 10½ inches..... | .80 |
| 1448. | BLOWPIPE, General Laboratory, of brass nickel-plated. The most convenient form of hand blowpipe or blast; of very light weight. Provides intensely hot flame, which is easily regulated in size and intensity from the finest needle flame to a large brush, by means of stopcocks on the air and gas tubes. Especially valuable in sealing glass and in repairing large pieces not easily handled. Total length, 9 inches; weight, 4½ ounces..... | 5.00 |
| 1450. | BLOWPIPE, Oxy-Hydrogen, all brass, on stand, with removable lime cylinder holder and two stopcocks | 8.00 |
| 1451. | BLOWPIPE only of No. 1450..... | 7.00 |
| 1454. | BLOWPIPE, Plattner's, of brass nickel-plated, with hard rubber mouthpiece, but without platinum tip | 1.70 |
| 1455. | BLOWPIPE TIP, of Platinum, for No. 1454, seamless, with small uniform hole. Price dependent upon the market price of platinum. | |
| 1458. | BLOWPIPE, Plattner's, brass, with hard rubber mouthpiece, fitted with side arm with stop-cock for attaching directly to gas supply, giving a very powerful blowpipe flame..... | 3.00 |

BLOWPIPE APPARATUS

BLOWPIPE TIPS for burners, see Nos. 2228 and 2230.

BUNSEN BURNER for blowpipe work, see general heading Burners.

- | | | |
|-------|---|---------------|
| 1464. | BUTTON BRUSH..... | .60 |
| 1466. | CARBON BLOCK, molded..... | .65 |
| 1467. | CARBON BLOCK HOLDER..... | .36 |
| 1468. | CARBON CYLINDER, molded, 1½x3 inches..... | .55 |
| 1470. | CHARCOAL BORER, club shape..... | 1.00 |
| 1472. | CHARCOAL BORER, four cornered..... | .70 |
| 1474. | CHARCOAL HOLDER, with platinum wire and shield..... | 3.00 |
| 1476. | CHARCOAL SQUARES, with covers, for charcoal holder..... | Each .40 |
| 1478. | CHARCOAL STICKS, natural willow wood, 4x1½ inches..... | Per dozen .50 |
| 1480. | CLAY CAPSULES..... | Per dozen .60 |
| 1482. | CLAY CRUCIBLES..... | Per dozen .70 |
- CUPELS, Bone Ash, see No. 3628.



No. 1518.

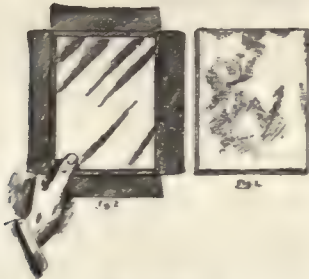
1484. **CUPEL HOLDER**, on wooden support, with two molds and stamp of brass, nickel-plated. Height, about $3\frac{1}{2}$ inches. \$2.00
1486. **FORCEPS**, Blowpipe, nickel-plated, with platinum tips. Length $5\frac{1}{2}$ inches. Price dependent upon market price of platinum.
1488. **HAMMER**, Plattner's, wooden handle.45
1490. **LAMP**, of polished brass. 1.25
1492. **MATRASSES**, Glass, flask shape. per dozen .72
1494. **MATRASS HOLDER**.40
1496. **MINERALS for Blowpipe**, 25 specimens, small size, in partitioned hardwood box. 2.00
1498. **MINERALS for Blowpipe**, 50 specimens, small size, each in tray, all enclosed in oak box. 3.00
1500. **MINERALS for Blowpipe**, 100 specimens, including all but the very rarest, each in tray, all enclosed in oak box. 7.50
1502. **PLATINUM WIRE**, with solid glass handle, for borax beads, etc.85
- PLATINUM GOODS**, see general heading **Platinum Ware**.
1504. **REAGENTS**, set of 14 one-ounce bottles filled with chemically pure blowpipe reagents, according to Fresenius. 4.50
1506. **SCALE**, Plattner's, of ivory, for silver beads. 3.50
1508. **SCALE of Hardness**, without diamond, 9 specimens. 2.00
1510. **SILVER FOIL**. per ounce 2.00
300. **STREAK PLATE**, unglazed porcelain, 60x100x4 mm thick.40
1514. **TUBES**, hard glass, $4 \times \frac{1}{4}$ inches, open at both ends. per dozen .45
1516. **TUBES**, hard glass, $4 \times \frac{1}{4}$ inches, closed at one end. per dozen .90
1518. **BLOWPIPE SET of Apparatus and Reagents**, as designed by Prof. Butler of the Colorado School of Mines for use in the laboratory and field. The various pieces are compactly arranged in a case with compartments and receptacles, especially designed to avoid breakage. Outside dimensions, $11\frac{3}{4} \times 6\frac{1}{2} \times 2\frac{3}{4}$ inches. Complete with wet and dry fluxes, and with lamps for alcohol and oil. 22.50
- The set contains the following pieces:—
- | | | |
|-----------------------------|-------------------|-------------------------|
| Blowpipe | 2 Sticks Charcoal | Microcosmic Salt |
| Platinum Wires and Holder | 6 Open Tubes | Sodium Carbonate |
| Combination Charcoal Borer, | Large Test Tube | Bismuth Flux |
| Magnet and Chisel | Small Test Tube | Borax |
| Streak Plate | Ammonium Hydrate | Potassium Bisulphate |
| Blue Litmus | Cobalt Nitrate | Oil Lamp (brass) |
| Red Litmus | Hydrochloric Acid | Alcohol Lamp (brass) |
| Anvil | Sulphuric Acid | Hammer |
| 3 Arsenic Tubes | Nitric Acid | Platinum Tipped Forceps |
| | Tin | |
1520. **POCKET HAND-BOOK OF BLOWPIPE ANALYSIS**, by G. Montague Butler, M. E. 1.00
- BOATS**, Combustion, see **Combustion Boats**.
- BOILERS**, see **Kettles**.
- BOLTING CLOTH**, see **Sieves**.



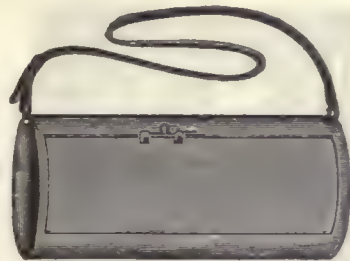
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No. 1558.



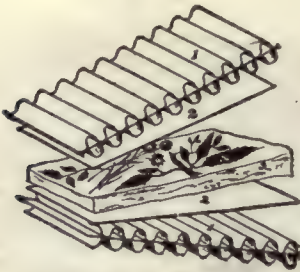
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No. 1538.

BOTANICAL APPARATUS

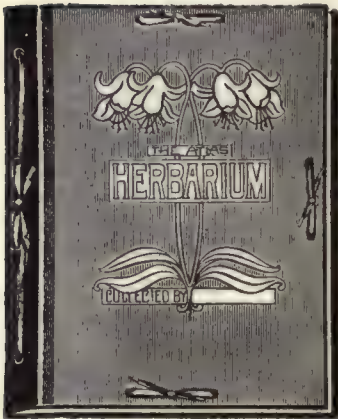
1530. **BOTANICAL ABSORPTION PAPER**, 11x16 inches, as used in No. 1558 Plant Press. Heavy felt paper, very absorbent.....per 100 sheets \$3.00
1532. **BOTANICAL ABSORPTION PAPER**, good quality blotting paper, size, 12x19 inches.....per 100 sheets 1.50
1533. **BOTANICAL ABSORPTION PAPER**, same as No. 1532, but in sheets 19x24 inches.....per 100 sheets 3.50
1536. **BOTANICAL ADHESIVE TAPE**, in rolls of 10 yards, $\frac{3}{4}$ inch wide, gummed, ready for use. Made of white cloth, easily cut and readily applied, presenting a neat and inconspicuous appearance on the mounting sheet. In box with slot enabling it to be withdrawn in any amount.....per roll .20
1538. **BOTANICAL COLLECTING CASE (Vasculum)**, of metal, finely enameled in green, with door opening entire length. Size $15\frac{3}{4} \times 5 \times 7\frac{1}{2}$ inches. Complete with leather shoulder strap and snaps.....2.00
1540. **BOTANICAL GENUS COVERS**, of heavy manila paper, with surface specially prepared for writing upon. Size folded, 12x18 inches.....per 100 sheets 2.00
1548. **BOTANICAL MOUNTING BOARD**, good quality Bristol board, plain. Size, 11x17 inches.....per 100 sheets 3.00
1549. **BOTANICAL MOUNTING BOARD**, same as No. 1548, but with printed form for plant description. Size, 11x17 inches.....per 100 sheets 5.00
1552. **BOTANICAL MOUNTING PAPER**, of heavy unsized stock, strong and durable. Color does not deteriorate with age. Size, 11x17 inches.....per 100 sheets 1.50
1554. **BOTANICAL MOUNTING PAPER**, heavy weight paper of grayish color, unsized surface. Size 11x17 inches.....per 100 sheets 1.10
1556. **BOTANICAL MOUNTS**, Biker's, suitable for mounting any botanical specimen. The mount consists of two parts—a thin plate of photographic glass to which narrow flaps of linen morocco paper are neatly fastened, and a cardboard back to which is glued a thin layer of sterilized surgical cotton in which the specimens are imbedded.
- | No. | A | B | C | D |
|-------------------|------|------------------------------------|------|-------|
| Size, inches..... | 5x6 | $6\frac{1}{2} \times 8\frac{1}{2}$ | 8x12 | 12x16 |
| Each..... | .25 | .30 | .50 | 1.00 |
| Per dozen..... | 2.80 | 3.50 | 6.00 | 12.00 |
- For other MOUNTS, see Specimen Mounts.
1558. **BOTANICAL PLANT PRESS**, simple, strong, portable, and satisfactory. Made of lattice work, it dries very rapidly, especially when used with No. 1530 Absorption Paper. Hung in sunlight or over a heater, specimens can be dried so rapidly as to preserve natural colors. From one to fifty or more specimens may be pressed at one time. Size, $11\frac{3}{4} \times 16\frac{3}{4}$ inches. Complete with straps as illustrated.....2.50



No. 1560, Fig. 1.



No. 1560, Fig. 2.



No. F8841.

Plant Description

Collector's Name _____ Date _____ 19__

Genus _____

Species _____

Locality _____

Substratum _____

Flower _____

Color _____

Reproductive _____

Male _____

Female _____

Number _____

Author _____

Illustrator _____

Field _____

Country _____

Region _____

Plant Use _____

Height _____

Locality _____

Remarks _____

CLASSIFICATION

Family _____

Genus _____

Species _____

Illustrator _____

Locality _____

No. F8847.

1560. **BOTANICAL PLANT PRESS, Riker's**, consisting of a series of layers of tubular paper inserted between sheets of blotting paper and absorbent cotton so that all the moisture is freely carried off by a current of hot air passing through the tubes. Fig. 1 represents a section showing the plant laid on the cotton. Fig. 2. The method of confining the heat from a lantern by a wrapping of paper dries the plants in a few hours and is adapted for camp or the tropics. If hung above a burner or placed in the sun splendid results are also obtained. Directions for use accompany each press.

No.	A	B
Size, inches.....	9x12	12x19
Each	\$2.00	3.25

1562. **BOTANICAL PRESSING PAPER**, thin white absorbent paper, folded and cut, for use with No. 1530 Absorption Paper.....per 100 sheets .50

1564. **BOTANICAL SPECIES COVERS**, of manila paper, size folded, 11½x17½ inches. Per 100 sheets..... 1.50

HERBARIUMS. Made in two sizes, 7¾x9¾ inches, and 11x17 inches, uniform in design with the Atlas Note Books. The portfolio form permits the specimens to be mounted scientifically according to the genus and species to which they belong. The plan also permits adding to or removing from the collection at any time. Hints on collecting, pressing and mounting specimens are found on inside cover pages. Each sheet contains a legend for classification, and an index is furnished.

No.	A	B
Atlas No.	709	1117
Size, inches	7¾x9¾	11x17
No. of sheets.....	40	25

F8841. **HERBARIUM**, complete, as described above..... .30 .57

F8842. **HERBARIUM COVERS** only.....Per set .12 .20

F8843. **MOUNTING SHEETS** only.....Per 100 .42 1.40

F8847. **PLANT DESCRIPTION PAPER**, with spaces on one side for complete analysis of a plant; the other side unruled. 7¾x9¾ inches, perforated for Nos. F8811 or F8842A Covers. In envelope of 20 sheetsPer envelope .07



No. 1574.



No. 1578.



No. 1582.



No. 1584.



No. 1586.

BOTTLES FOR GENERAL USE

1574. BOTTLES, narrow mouth, round, flint glass.

Capacity, ounces	1/2	1	2	4	6	8	12	16	32	64
To take cork stopper, No...	1	1	2	3	4	5	5	5	7	9
Number in original case....	864	864	720	432	360	288	216	144	72	48
Per dozen .....	.58	.62	.68	.94	1.08	1.24	1.60	1.78	2.70	5.00
Per gross in original case..	\$5.50	5.90	6.50	9.00	10.30	11.80	15.20	17.00	25.80	48.40

1576. BOTTLES, narrow mouth, round, green glass.

Capacity, gallons	1/2	1	2	5
To take cork stopper, No.....	10	12	15	19
Number in original case.....	48	24	12	6
Each .....	.30	.48	1.60	3.00
Per dozen in original case.....	2.80	4.40	18.00	31.20

1578. BOTTLES, wide mouth, round, flint glass.

Capacity, ounces	1/2	1	2	4	6	8	12	16	32	64
To take cork stopper, No...	7	8	12	14	14	18	18	20	26	..
To take rubber stopper, No..	3	4	5	6	7	8	8	9	11	13
Number in original case....	864	864	720	432	360	288	216	144	72	48
Per dozen .....	.60	.65	.70	1.00	1.15	1.30	1.68	1.84	2.80	5.15
Per gross in original case..	5.70	6.10	6.70	9.50	10.70	12.20	16.00	17.80	26.70	49.40

1580. BOTTLES, wide mouth, round, green glass.

Capacity, gallons	1/2	1	2	5
Number in original case.....	36	24	12	6
Each .....	.32	.50	1.75	3.10
Per dozen in original case.....	2.90	4.50	16.70	30.00

1582. BOTTLES, extra wide mouth, round, flint glass.

Capacity, ounces	1	2	3	4	6	8
Diameter of body, inches.....	1 11/16	1 7/8	2 3/16	2 3/8	2 5/8	2 3/4
Diameter of neck, inside, inches.....	1	1 3/16	1 3/8	1 5/8	1 5/8	1 5/8
To take rubber stopper, No.....	5	6	6	9	9	9
Height over all, inches.....	2	2 3/8	2 9/16	2 3/4	3 5/16	3 7/8
Number in original case.....	864	720	576	432	360	288
Per dozen .....	.94	1.08	1.23	1.45	1.67	1.90
Per gross in original case.....	9.00	10.30	12.20	14.00	16.00	18.30

1584. BOTTLES, tincture, flint glass, mushroom stopper.

Capacity, ounces	1	2	4	8	16	32
Number in original case.....	864	720	432	288	144	72
Per dozen	1.75	1.94	2.30	2.80	3.86	5.40
Per gross in original case.....	16.80	18.70	22.20	26.90	37.00	51.70
Capacity, gallons				1/2	1	2
Number in original case.....				48	36	12
Each				1.05	1.56	3.40
Per dozen in original case.....				10.00	15.00	32.50

1586. BOTTLES, tincture, flint glass, low form, with flat topped glass stopper.

Capacity, ounces.....	1	2	4	8	16	32
Number in original case.....	864	720	432	288	144	72
Per dozen.....	2.00	2.20	2.60	3.20	4.35	6.35
Per gross in original case.....	18.90	21.00	24.90	30.50	42.00	61.00
Capacity, gallons.....				½	1	2
Number in original case.....				48	36	12
Each.....				1.10	2.65	4.75
Per dozen in original case.....				10.50	25.40	46.20

No. 1588.
No. 1592.

No. 1594.

No. 1596.

No. 1598.

No. 1612.

No. 1614.

1588. BOTTLES, tincture, flint glass, with reagent stopper.

Capacity, ounces.....	1	2	4	8	16	32
Number in original case.....	864	720	432	288	144	72
Per dozen.....	1.75	1.94	2.30	2.80	3.86	5.40
Per gross in original case.....	\$16.80	18.70	22.20	26.90	37.00	51.70
Capacity, gallons.....					$\frac{1}{2}$	1
Number in original case.....					48	36
Each.....					.85	2.15
Per dozen in original case.....					9.15	20.80

1590. BOTTLES, tincture, of amber glass, with glass stopper.

Capacity, ounces.....	1	2	4	8	16	32
Number in original case.....	864	720	432	288	144	72
Per dozen.....	2.00	2.20	2.75	3.30	4.60	6.45
Per gross in original case.....	20.00	22.40	26.60	32.25	44.40	62.00

1592. BOTTLES, narrow mouth, green glass, with vertical stopper, for acids.

	pints		gallons		
Capacity.....	1	2	$\frac{1}{2}$	1	2
Number in original case.....	72	72	36	24	12
Each.....	.35	.45	.75	1.15	2.50
Per dozen in original case.....	3.60	4.90	8.40	11.40	23.80

1594. BOTTLES, salt mouth, flint glass, mushroom stopper.

Capacity, ounces.....	1	2	4	8	16	32
Number in original case.....	864	720	432	288	144	72
Per dozen.....	1.80	1.98	2.40	2.85	3.90	5.65
Per gross in original case.....	17.20	18.90	22.70	27.70	37.80	54.60
Capacity, gallons.....				$\frac{1}{2}$	1	2
Number in original case.....				48	48	24
Each.....				.95	2.10	4.25
Per dozen in original case.....				10.20	20.00	40.80

1596. BOTTLES, salt mouth, flint glass, with flat glass stopper.

Capacity, ounces.....	1	2	4	8	16	32
Number in original case.....	864	720	432	288	144	72
Per dozen.....	2.00	2.20	2.65	3.25	4.40	6.90
Per gross in original case.....	19.40	21.10	25.50	31.20	42.50	61.50

1598. BOTTLES, wide mouth, hollow ground glass stopper, enabling spoon or spatula to be kept in bottle. Complete with horn spoon.

Capacity, ounces.....		2	4
Each.....		.50	.90
Per dozen.....		5.00	9.00

1610. BOTTLES, Aspirator, of heavy glass, with tubulature at bottom.

No.	A	B	C	D	E
Capacity, gallons.....	$\frac{1}{2}$	1	2	3	5
Each.....	2.00	3.25	5.00	8.00	12.00

1612. BOTTLES, Aspirator, of heavy glass, with glass stopper and glass stopcock ground in tubulature.

Capacity, ounces.....			8	16	32
Each.....			3.00	3.50	4.00
Capacity, gallons.....	$\frac{1}{2}$	1	2	3	5
Each.....	8.00	12.00	14.00	16.00	19.00

1614. BOTTLES, Aspirator, of heavy glass, with narrow outlet for connecting rubber tubing.

Capacity, ounces.....		4	8	16	32
Each.....		.60	.70	.90	1.10
Capacity, gallons.....			$\frac{1}{2}$	1	2
Each.....			1.65	1.75	3.00



No. 1618.



No. 1620.



No. 1622.



No. 1624.



No. 1628.



No. 1630.



No. 1634.



No. 1638.



No. 1640.



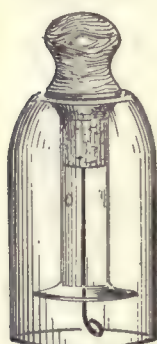
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No. 1645.

BOTTLES FOR SPECIAL USES

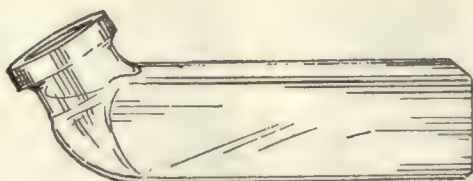
1616.	BOTTLES, Aspirator, graduated, of heavy glass, with outlet for rubber tubing.						
	Capacity, liters.....	1	2	4			
	Each	\$2.50	3.30	4.50			
1618.	BOTTLE, Balsam, with glass cap, and loosely fitting glass dropper. Capacity, 30 cc.....						
							.32
1620.	BOTTLE, Balsam, wide mouth, with glass rod and glass cap ground to fit against shoulder of bottle. Capacity, 30 cc.....						
							.40
1622.	BOTTLE, Dropping, with Barnes' pipette stopper, square shape. Capacity, 30 cc.....						
							.10
1624.	BOTTLES, Dropping, with ground in pipette, with rubber bulb.						
	Capacity, cc.....		30	60			
	Each .....		.38	.40			
1628.	BOTTLES, Dropping, with ground in thistle top pipette, with rubber cap to control delivery.						
	Capacity, cc.....		30	60			
	Each .....		.40	.50			
1630.	BOTTLES, Dropping, Rauvier's, with ball top pipette ground in.						
	Capacity, cc.....		30	60			
	Each .....		.50	.55			
1634.	BOTTLES, Dropping, "TK", with grooved flat glass stopper.						
	Capacity, cc.....	15	30	50	100	200	
	Each .....	.20	.25	.30	.35	.45	
1638.	BOTTLES, Dropping, "TK", with grooved vertical stopper.						
	Capacity, cc.....		30	50	100		
	Each .....		.25	.30	.35		
1640.	BOTTLE, Dropping, Schuster's, with ground-in glass stopper. Capacity, 30 cc.....						
							\$0.60
1641.	BOTTLE, Dropping, Schuster's, without stopper. Capacity, 30 cc.....						
							.40
	BOTTLES, Gas Generating, see Gas Generators.						
	BOTTLES, Gas Washing, see Gas Washing Bottles.						
1644.	BOTTLES, Homeopathic Vials, long form.						
	Capacity, drams.....	1	2	3	4	6	8
	Dimensions, mm	63x11	75x12	90x14	90x17	105x19	120x20
	Per gross.....	1.75	2.10	2.80	4.20	5.60	7.00
1645.	BOTTLES, Homeopathic Vials, short form.						
	Capacity, drams	1	2	3	4	6	8
	Dimensions, mm.....	42x14	58x16	64x19	68x20	80x22	83x24
	Per gross	1.75	2.10	2.80	4.20	5.60	7.00



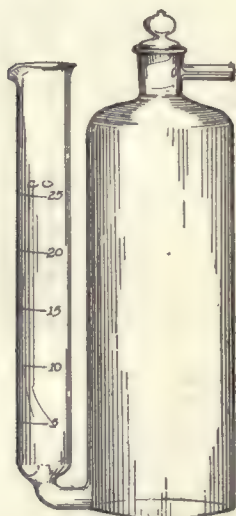
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No. 1650.



No. 1654.



No. 1658.



No. 1662.



No. 1666.

1648. **BOTTLE, Immersion Oil**, unspillable, with wooden stopper and wire dropper..... \$0.60
1650. **BOTTLE, Immersion Oil**, with nickel-plated cap, which cannot gum, and device for regulating amount of oil on plunger..... .75
1654. **BOTTLES, Insect, bent neck.**
- | | | |
|-----------------------|---------------|------|
| Capacity, ounces..... | $\frac{1}{2}$ | 2 |
| Per dozen..... | .90 | 1.60 |
1656. **BOTTLE, Insect, cyanide**, for collecting and killing, 4 ounce, ready for use..... .25
1658. **BOTTLE, Measuring**, designed by C. V. Bockius, of the Underwriters' Laboratories, for rapidly measuring and delivering a certain quantity of reagent where an approximate measurement is sufficient. An air opening is provided at the top for controlling the flow. Graduated to 25 cc in 5 cc divisions. Capacity of bottle, about 250 cc..... 6.00
1662. **BOTTLES, Oil Sample**, clear flint glass, with rounded shoulder and concave bottom. The 4 ounce size is cleaned and fitted with corks.
- | | | | | |
|-----------------------|-----|-----|------|------|
| Capacity, ounces..... | 1 | 2 | 4 | 8 |
| Each | .07 | .08 | .12 | .15 |
| Per dozen..... | .60 | .80 | 1.15 | 1.50 |
1664. **BOTTLES, Oil Sample**, 4 ounce size, clear flint glass, with square shoulder and flat polished bottom. Cleaned and fitted with corks.....
- | | |
|-----------------|------|
| Each | .20 |
| Per dozen | 2.00 |
1666. **BOTTLES, Pressure, Lintner's**, for digestion under pressure, with glass cap and rubber gasket, mounted in brass frame.
- | | | |
|-------------------|------|------|
| Capacity, cc..... | 125 | 250 |
| Each | 3.00 | 4.00 |



No. 1674.



No. 1690.

BOTTLES FOR REAGENTS

BOTTLES, Reagent, with raised letters with surfaces ground. Only those bottles with labels listed below are manufactured.

PLEASE ORDER BY BOTTLE NUMBER.

1672. **BOTTLES, Reagent**, narrow mouth, 1 oz., height 3 5/8 inches.....Per dozen \$1.60

No.	No.
326. Cobaltous Nitrate..... $\text{Co}(\text{NO}_3)_2$	325. Silver Nitrate (Amber)..... AgNO_3
336. Gold Chloride..... AuCl_3	341. Blank.
327. Platinic Chloride..... PtCl_4	

1674. **BOTTLES, Reagent**, narrow mouth, 4 oz., height, 5 1/4 inches.....Per dozen 2.40

No.	No.
3. Acetic Acid..... $\text{HC}_2\text{H}_3\text{O}_2$	100. Mercuric Potassium Iodide.
30. Alcohol..... $\text{C}_2\text{H}_5\text{OH}$	86. Mercurous Nitrate..... HgNO_2
18. Ammonium Carbonate..... $(\text{NH}_4)_2\text{CO}_3$	415. Methyl Alcohol..... CH_3OH
17. Ammonium Chloride..... NH_4Cl	411. Methyl Orange.
15. Ammonium Hydroxide..... NH_4OH	88. Nessler's Solution.
82. Ammonium Molybdate..... $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24}$	5. Nitric Acid..... HNO_3
19. Ammonium Oxalate..... $(\text{NH}_4)_2\text{C}_2\text{O}_4$	422. Nitric Acid, Con..... HNO_3
16. Ammonium Sulphide (Amber). $(\text{NH}_4)_2\text{S}$	430. Nitric Acid, Dil..... HNO_3
31. Ammonium Sulphocyanide..... NH_4CNS	425. Obermayer's Reagent.
97. Ammonium Sulphydrate..... NH_4HS	93. Oxalic Acid..... $\text{H}_2\text{C}_2\text{O}_4$
33. Barium Carbonate..... BaCO_3	423. Phenol..... $\text{C}_6\text{H}_5\text{OH}$
20. Barium Chloride..... BaCl_2	412. Phenolphthalein.
32. Barium Hydroxide..... $\text{Ba}(\text{OH})_2$	94. Picric Acid..... $\text{HC}_6\text{H}_2(\text{NO}_2)_3\text{O}$
401. Barium Nitrate..... $\text{Ba}(\text{NO}_3)_2$	37. Platinic Chloride..... PtCl_4
426. Bromine for Hypobromite.	8. Potassium Carbonate..... K_2CO_3
406. Bromine Water.	96. Potassium Chromate..... K_2CrO_4
21. Calcium Chloride..... CaCl_2	13. Potassium Dichromate..... $\text{K}_2\text{Cr}_2\text{O}_7$
23. Calcium Hydroxide..... $\text{Ca}(\text{OH})_2$	11. Potassium Ferricyanide..... $\text{K}_3\text{Fe}(\text{CN})_6$
22. Calcium Sulphate..... CaSO_4	6. Potassium Ferrocyanide..... $\text{K}_4\text{Fe}(\text{CN})_6$
83. Carbon Disulphide..... CS_2	12. Potassium Hydroxide..... KOH
407. Chloroform..... CHCl_3	10. Potassium Iodide..... KI
408. Cochineal.	9. Potassium Sulphate..... K_2SO_4
409. Coralline.	7. Potassium Sulphocyanide..... KCNS
36. Cupric Sulphate..... CuSO_4	26. Silver Nitrate (Amber)..... AgNO_3
421. Dimethyl Glyoxime..... $(\text{CH}_3)_2\text{C}_2(\text{NOH})_2$	404. Silver Sulphate..... Ag_2SO_4
35. Ether..... $(\text{C}_2\text{H}_5)_2\text{O}$	60. Sodium Acetate..... $\text{NaC}_2\text{H}_3\text{O}_2$
58. Fehling's Solution.	59. Sodium Carbonate..... Na_2CO_3
29. Ferric Chloride..... FeCl_3	416. Sodium Cobaltic Nitrite.
28. Ferrous Sulphate..... FeSO_4	61. Sodium Hydroxide..... NaOH
2. Hydrochloric Acid..... HCl	427. Sodium Hydroxide for Hypo-
419. Hydrochloric Acid, Con..... HCl	bromite..... NaOH
429. Hydrochloric Acid, Dil..... HCl	14. Sodium Phosphate..... Na_2HPO_4
428. Hydrogen Peroxide..... H_2O_2	417. Sodium Thiosulphate..... $\text{Na}_2\text{S}_2\text{O}_3$
1. Hydrogen Sulphide (Amber). H_2S	81. Stannous Chloride..... SnCl_2
87. Indigo Solution.	4. Sulphuric Acid..... H_2SO_4
414. Iodine Solution..... $\text{I} + \text{KI}$	420. Sulphuric Acid, Con..... H_2SO_4
27. Lead Acetate..... $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$	431. Sulphuric Acid, Dil..... H_2SO_4
410. Litmus.	424. Tinct. Gualac.
90. Magnesia Mixture.	413. Turmeric.
24. Magnesium Sulphate..... MgSO_4	38. Blank.
25. Mercuric Chloride..... HgCl_2	

1676. **BOTTLES, Reagent, 4 oz., set of 40 Reagent Bottles No. 1674, including the most common names used in the chemical laboratory: Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 59, 61, and 3 blanks.....Per set \$8.00**

1678. **BOTTLES, Reagent, 4 oz., set of 24 according to Fresenius, including Nos. 2, 3, 4, 5, 6, 7, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 25, 26, 27, 29, 32, 36, 59 and 61.....Per set 4.80**

1680. **BOTTLES, Reagent, 4 oz., set of 12, consisting of Nos. 1, 2, 3, 4, 5, 15, 16, 20, 23, 26, 27 and 61.Per set 2.40**

1682. **BOTTLES, Reagent, narrow mouth, 8 oz., height, 6½ inches.....Per dozen 3.00**

No.	
131.	Acetic Acid $\text{HC}_2\text{H}_3\text{O}_2$
126.	Alcohol $\text{C}_2\text{H}_5\text{OH}$
110.	Ammonium Carbonate $(\text{NH}_4)_2\text{CO}_3$
109.	Ammonium Chloride NH_4Cl
108.	Ammonium Hydroxide NH_4OH
155.	Ammonium Molybdate $(\text{NH}_4)_2\text{Mo}_2\text{O}_7$
130.	Ammonium Oxalate $(\text{NH}_4)_2\text{C}_2\text{O}_4$
158.	Ammonium Phosphate $(\text{NH}_4)_3\text{HPO}_4$
122.	Ammonium Sulphide (Amber). $(\text{NH}_4)_2\text{S}$
114.	Barium Chloride BaCl_2
151.	Calcium Hydroxide $\text{Ca}(\text{OH})_2$
159.	Ether $(\text{C}_2\text{H}_5)_2\text{O}$
154.	Ferrous Sulphate FeSO_4
105.	Hydrochloric Acid, Con. HCl
106.	Hydrochloric Acid, Dil. HCl
107.	Hydrogen Sulphide (Amber). H_2S
152.	Lead Acetate $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$

No.	
153.	Mercuric Chloride HgCl_2
103.	Nitric Acid, Con. HNO_3
104.	Nitric Acid, Dil. HNO_3
171.	Potassium Carbonate K_2CO_3
160.	Potassium Chromate K_2CrO_4
172.	Potassium Ferricyanide $\text{K}_3\text{Fe}(\text{CN})_6$
173.	Potassium Ferrocyanide. $\text{K}_4\text{Fe}(\text{CN})_6$
150.	Potassium Hydroxide KOH
145.	Silver Nitrate (Amber) AgNO_3
112.	Sodium Carbonate Na_2CO_3
111.	Sodium Hydroxide NaOH
129.	Sodium Phosphate Na_3HPO_4
156.	Stannous Chloride SnCl_2
101.	Sulphuric Acid, Con. H_2SO_4
102.	Sulphuric Acid, Dil. H_2SO_4
116.	Blank.

1684. **BOTTLES, Reagent, narrow mouth, 16 oz. (pint), height, 7¾ inches.....Per dozen 4.30**

No.	
237.	Acetic Acid $\text{HC}_2\text{H}_3\text{O}_2$
235.	Ammonium Carbonate $(\text{NH}_4)_2\text{CO}_3$
234.	Ammonium Chloride NH_4Cl
204.	Ammonium Hydroxide NH_4OH
227.	Ammonium Hydroxide, Dil. $\text{NH}_4\text{OH} + \text{Aq}$
229.	Ammonium Sulphide, Dil. $(\text{NH}_4)_2\text{S} + \text{Aq}$
236.	Ammonium Sulphide (Amber). $(\text{NH}_4)_2\text{S}$
218.	Barium Chloride BaCl_2
223.	Calcium Hydroxide $\text{Ca}(\text{OH})_2$
225.	Calcium Sulphate CaSO_4
230.	Ether $(\text{C}_2\text{H}_5)_2\text{O}$
224.	Ferrous Sulphate FeSO_4
217.	Hydrochloric Acid HCl

No.	
222.	Hydrochloric Acid, Con. HCl
231.	Hydrochloric Acid, Dil. HCl
226.	Hydrodisodic Phosphate Na_2HPO_4
216.	Nitric Acid HNO_3
219.	Nitric Acid, Con. HNO_3
232.	Nitric Acid, Dil. HNO_3
238.	Potassium Chromate K_2CrO_4
221.	Potassium Hydroxide KOH
240.	Silver Nitrate (Amber) AgNO_3
233.	Sodium Hydroxide NaOH
215.	Sulphuric Acid H_2SO_4
220.	Sulphuric Acid, Con. H_2SO_4
211.	Blank.

1686. **BOTTLES, Reagent, narrow mouth, 32 oz. (quart), height, 9½ inches.....Per dozen 6.00**

No.	
505.	Hydrochloric Acid, Con. HCl
506.	Hydrochloric Acid, Dil. HCl
503.	Nitric Acid, Con. HNO_3
504.	Nitric Acid, Dil. HNO_3

No.	
501.	Sulphuric Acid, Con. H_2SO_4
502.	Sulphuric Acid, Dil. H_2SO_4
511.	Blank.

1688. **BOTTLES, Reagent, wide mouth, 1 oz., height, 3¼ inches.....Per dozen 1.70**

No.	
374.	Ammonium Phosphate $(\text{NH}_4)_3\text{HPO}_4$
361.	Ammonium Sodium Phosphate. $\text{NaNH}_4\text{HPO}_4$
351.	Borax $\text{Na}_2\text{B}_4\text{O}_7$
364.	Copper Cu
365.	Ferrous Sulphate FeSO_4
366.	Ferrous Sulphide FeS
377.	Phenyl Hydrazine $\text{C}_6\text{H}_5\text{NH.NH}_2$
367.	Potassium Chlorate KClO_3
358.	Potassium Cyanide KCN
368.	Potassium Ferricyanide $\text{K}_3\text{Fe}(\text{CN})_6$

No.	
354.	Potassium Nitrate KNO_3
372.	Test Paper.
353.	Sodium Acetate $\text{NaC}_2\text{H}_3\text{O}_2$
369.	Sodium Bitartrate $\text{NaHC}_4\text{H}_4\text{O}_6$
350.	Sodium Carbonate Na_2CO_3
370.	Sodium Nitrate NaNO_3
376.	Sod. Pot. Carbonate. $\text{Na}_2\text{CO}_3, \text{K}_2\text{CO}_3$
371.	Starch.
373.	Zinc.
375.	Blank.

1690. **BOTTLES, Reagent, wide mouth, 4 oz., height, 4¾ inches.....Per dozen 2.75**

No.	
314.	Ammonium Sulphate $(\text{NH}_4)_2\text{SO}_4$
304.	Borax $\text{Na}_2\text{B}_4\text{O}_7$
305.	Ferrous Sulphate FeSO_4
303.	Potassium Cyanide KCN
302.	Potassium Nitrate KNO_3

No.	
313.	Sod. Am. Hyd. Phos. $\text{Na}(\text{NH}_4)\text{HPO}_4 + 4\text{H}_2\text{O}$
301.	Sodium Carbonate Na_2CO_3
312.	Test Paper.
307.	Blank.

1694. **CAPS for reagent bottles.**

No.	A	B	C	D
For bottles of capacity, ounces.....	1 to 4	8	16	32
Height inside, inches.....	2¼	2½	2¾	2⅞
Diameter inside, inches.....	1⅞	1⅞	2	2⅞
Per dozen	1.50	1.65	1.80	2.00



Nos. 1696-8.



No. 1710.



No. 1712.



Nos. 1714-5.



No. 1718.

BOTTLES, Reagent, Jewett's, similar to No. 1674, but with specially made stopper, with flange extending downward over lip of bottle to furnish protection from dust. Flange does not touch lip of bottle, and cannot become gummed to it. Knob of stopper is made extremely heavy, so that when stopper is laid on table the tip is raised preventing contamination. Each stopper has raised symbol of reagent blown in it, so that stoppers and bottles cannot be mixed. Bottles for Sodium and Potassium Hydroxides have loosely fitting stoppers preventing sticking. Please order by bottle number.

1696. BOTTLES, Reagent, Jewett's, narrow mouth, 4 oz., height $5\frac{3}{4}$ inches.....per dozen \$5.25

No.		
30.	Acetic Acid	$\text{HC}_2\text{H}_3\text{O}_2$
300.	Alcohol	$\text{C}_2\text{H}_5\text{OH}$
180.	Ammonium Carbonate	$(\text{NH}_4)_2\text{CO}_3$
170.	Ammonium Chloride	NH_4Cl
150.	Ammonium Hydroxide	NH_4OH
190.	Ammonium Oxalate	$(\text{NH}_4)_2\text{C}_2\text{O}_4$
160.	Ammonium Sulphide (Amber)	$(\text{NH}_4)_2\text{S}$
310.	Ammonium Sulphocyanide	NH_4CNS
330.	Barium Carbonate	BaCO_3
200.	Barium Chloride	BaCl_2
320.	Barium Hydroxide	$\text{Ba}(\text{OH})_2$
210.	Calcium Chloride	CaCl_2
230.	Calcium Hydroxide	$\text{Ca}(\text{OH})_2$
220.	Calcium Sulphate	CaSO_4
360.	Cupric Sulphate	CuSO_4
350.	Ether	$(\text{C}_2\text{H}_5)_2\text{O}$
290.	Ferric Chloride	Fe_2Cl_3
280.	Ferrous Sulphate	FeSO_4
20.	Hydrochloric Acid	HCl

No.		
10.	Hydrogen Sul. (Amber)	H_2S
270.	Lead Acetate	$\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$
240.	Magnesium Sulphate	MgSO_4
250.	Mercuric Chloride	HgCl_2
50.	Nitric Acid	HNO_3
80.	Potassium Carbonate	K_2CO_3
130.	Potassium Dichromate	$\text{K}_2\text{Cr}_2\text{O}_7$
110.	Potassium Ferricyanide	$\text{K}_3\text{Fe}(\text{CN})_6$
60.	Potassium Ferrocyanide	$\text{K}_4\text{Fe}(\text{CN})_6$
120.	Potassium Hydroxide	KOH
100.	Potassium Iodide	KI
90.	Potassium Sulphate	K_2SO_4
70.	Potassium Sulphocyanide	KCNS
260.	Silver Nitrate (Amber)	AgNO_3
590.	Sodium Carbonate	Na_2CO_3
610.	Sodium Hydroxide	NaOH
140.	Sodium Phosphate	Na_2HPO_4
40.	Sulphuric Acid	H_2SO_4
380.	Blank.	

1698. BOTTLES, Reagent, Jewett's, narrow mouth, 8 oz., height, $7\frac{1}{4}$ inches.....per dozen 6.25

No.		
1310.	Acetic Acid	$\text{HC}_2\text{H}_3\text{O}_2$
1260.	Alcohol	$\text{C}_2\text{H}_5\text{OH}$
1100.	Ammonium Carbonate	$(\text{NH}_4)_2\text{CO}_3$
1090.	Ammonium Chloride	NH_4Cl
1080.	Ammonium Hydroxide	NH_4OH
1300.	Ammonium Oxalate	$(\text{NH}_4)_2\text{C}_2\text{O}_4$
1220.	Ammonium Sulphide (Amber)	$(\text{NH}_4)_2\text{S}$
1140.	Barium Chloride	BaCl_2
1510.	Calcium Hydroxide	$\text{Ca}(\text{OH})_2$
1050.	Hydrochloric Acid, Con.	HCl
1070.	Hydrogen Sul. (Amber)	H_2S

No.		
1520.	Lead Acetate	$\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$
1030.	Nitric Acid, Con.	HNO_3
1040.	Nitric Acid, Dil.	HNO_3
1500.	Potassium Hydroxide	KOH
1450.	Silver Nitrate (Amber)	AgNO_3
1120.	Sodium Carbonate	Na_2CO_3
1110.	Sodium Hydroxide	NaOH
1290.	Sodium Phosphate	Na_2HPO_4
1010.	Sulphuric Acid, Con.	H_2SO_4
1020.	Sulphuric Acid, Dil.	H_2SO_4
1160.	Blank.	

1710. BOTTLES, Hard Rubber, square, with tight screw cap, for hydrofluoric acid.

Capacity, ounces.....	1	2	4	6	16	32
Each .....	.50	.60	.80	1.20	1.60	4.00

1712. BOTTLES, Screw-Cap Vials, with cork-lined aluminum screw cap.

Capacity, drams	1	2	4	8	12
Dimensions, inches	$1\frac{3}{4} \times \frac{5}{8}$	$2\frac{3}{4} \times \frac{5}{8}$	$2\frac{5}{8} \times \frac{3}{4}$	$3\frac{1}{2} \times \frac{7}{8}$	$5\frac{1}{2} \times \frac{7}{8}$
Per dozen	\$0.35	.40	.60	.90	1.25

1714. BOTTLES, Serum, or Vaccine, of amber glass. All capacities have same size neck, taking the same stopper.

Capacity, cc.....	1 to 2	3 to 4	5	8	10	15	20	25	30
Per gross.....	2.25	2.80	3.50	4.25	5.60	7.00	8.40	9.80	11.20

1715. RUBBER STOPPERS, special form for Serum Bottles No. 1714.....per gross 2.80

1718. BOTTLES, Shell Vials, round, straight wall.

No.	1	2	3	4	5
Height, mm.....	50	60	70	80	75
Diameter, mm.....	12	13	15	16	25
Capacity, cc.....	4	7	11	14	34
Per dozen .....	.25	.27	.28	.33	.50
Per gross	2.00	2.50	2.75	3.00	4.50



No. 1720.



Nos. 1722-4.



No. 1728.



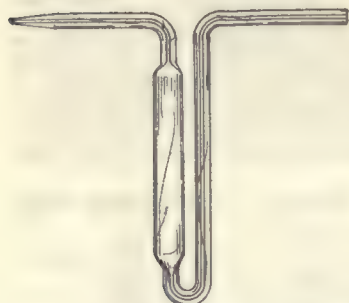
No. 1730.



No. 1732.



No. 1734.



No. 1740.



No. 1736.



No. 1742.

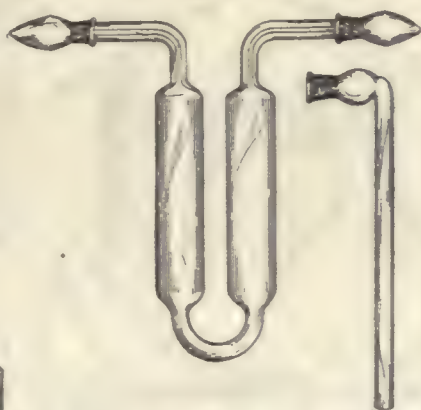


No. 1744.

1720. BOTTLES, Show, Inverted, for storing and exhibiting sample grains, chemicals, etc.								
Capacity, pints	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8	
Height, inches	$3\frac{3}{4}$	$4\frac{3}{4}$	6	$7\frac{3}{4}$	9	11	14	
Diameter, inches	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{5}{8}$	$4\frac{1}{4}$	$5\frac{3}{4}$	
Each	\$0.25	.30	.35	.45	.60	1.10	2.00	
1722. BOTTLES, Specific Gravity, unadjusted, with perforated stopper.								
Capacity, approx., cc.	10	25	50	100				
Each	.55	.65	.90	1.60				
1724. BOTTLES, Specific Gravity, accurately adjusted at 20°C., with perforated stopper.								
Capacity, cc.	10	25	50	100				
Each	1.25	1.45	1.80	2.25				
1725. BOTTLES, Specific Gravity, same as No. 1724, in tin case with counterpoise.								
Capacity, cc.	10	25	50	100				
Each	2.50	2.75	3.25	4.00				
1728. BOTTLES, Specific Gravity, Boot's, double walled, with vacuum, maintaining constant temperature inside. With perforated stopper and ground cap.								
Capacity, cc.	25	50						
Each	4.00	5.00						
1730. BOTTLES, Specific Gravity, Geissler's, with thermometer reading from 8° to 40°C. in ground in central neck, and cap ground on side neck.								
Capacity, cc.	25	50	100					
Each	4.00	4.50	5.50					
1732. BOTTLE, Specific Gravity, Hogarth's, specially recommended by the United States Bureau of Mines for coal and coke. Widely used for specific gravity of iron ores. Capacity, about 100 cc.								
							2.00	
1734. BOTTLE, Specific Gravity, Hubbard's, for asphalts, bitumens, and dense oils. With glass stopper concave on under side, with opening 1.6 mm to permit escape of air. Height, 70 mm; diameter, 22 mm; capacity, about 24 cc.							2.00	
1736. BOTTLE, Specific Gravity, Le Chatelier's, for cement, special form recommended by the United States Bureau of Standards for use in Government Specifications. (See Circular 33 of the United States Bureau of Standards.) Without certificate.							6.00	
1737. BOTTLE, Specific Gravity, same as No. 1736, but standardized by the United States Bureau of Standards, with certificate.							8.00	
1740. BOTTLE, Specific Gravity, Nicol's Tube, for liquids							.70	
1742. BOTTLES, Specific Gravity, Regnault's, for liquids, with ground-in stopper.								
Capacity, cc.	25	50						
Each	1.50	1.70						
1744. BOTTLES, Specific Gravity, Regnault's, for solids, with ground-in neck and stopper.								
Capacity, cc.	25	50						
Each	2.00	2.50						



No. 1746.



No. 1748.



No. 1750.



No. 1752.



No. 1754.



No. 1756.



No. 1758.

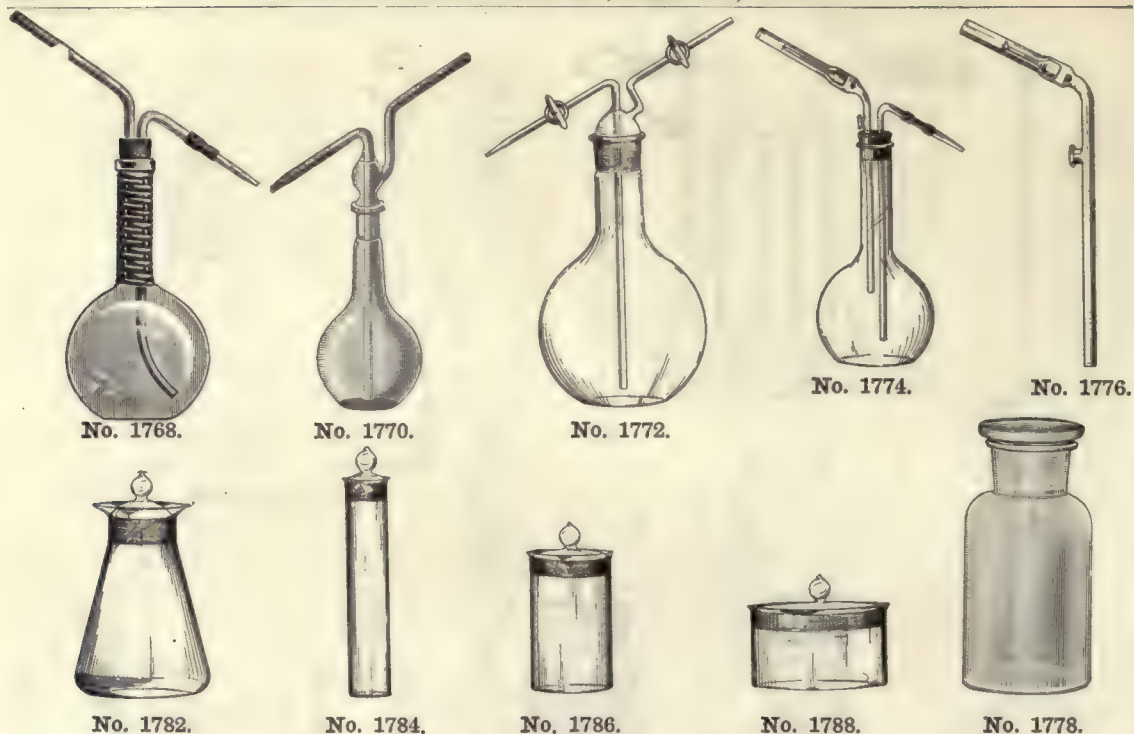


No. 1764.



No. 1766.

1746. **BOTTLE, Specific Gravity, Schumann's**, for cement, with tube graduated to 50 cc in $\frac{1}{10}$ cc divisions \$2.75
1748. **BOTTLE, Specific Gravity, Sprengel's**, with ground on suction tube, and ground caps. Height over all, about 100 mm; diameter of tubes, 14 mm..... 1.50
1750. **BOTTLE, Specific Gravity, Walker's**, for very fluid liquids, as described in Bulletin 109 of the Bureau of Chemistry, United States Department of Agriculture. Capacity, about 20 cc. 2.00
1752. **BOTTLE, Specific Gravity, Walker's**, same as No. 1750, for very viscous liquids. Capacity, about 30 cc..... 2.50
1754. **SPECIFIC GRAVITY BOTTLE, Weld's Precision**. For the precise determination of the density of liquids and salt solutions as designed by Prof. Leroy D. Weld of Coe College. With ground-on cap and pointed stopper. Especially valuable for use with highly volatile liquids since the ground-on cap prevents evaporation. The pointed stopper prevents the formation of an overflow drop. With this bottle weighings can be made to an accuracy of 1/1000 of 1 per cent., or with twice the accuracy of those made with a flat stoppered bottle similarly capped. Capacity, about 25 cc..... 2.25
1756. **BOTTLES, Specimen or Sample**, of glass, round, with cork-lined aluminum screw-caps.
- | | | | | | |
|------------------|-----------------|-----------------|-----------------|-------------------|-----------------|
| Capacity, ounces | 1 | 2 | 4 | 8 | 16 |
| Height, inches | 3 $\frac{1}{8}$ | 3 $\frac{3}{4}$ | 4 $\frac{3}{4}$ | 4 $\frac{11}{16}$ | 5 $\frac{3}{4}$ |
| Diameter, inches | 1 $\frac{1}{8}$ | 1 $\frac{1}{2}$ | 1 $\frac{7}{8}$ | 2 $\frac{1}{2}$ | 3 $\frac{1}{8}$ |
| Per dozen | .75 | .80 | 1.00 | 1.50 | 2.20 |
1758. **BOTTLES, Specimen or Sample**, of glass, square, with cork-lined aluminum screw-caps.
- | | | | | |
|------------------|-----------------|-----------------|-------------------|------------------|
| Capacity, ounces | 1 | 2 | 4 | 8 |
| Height, inches | 2 $\frac{1}{2}$ | 3 $\frac{1}{8}$ | 4 $\frac{1}{2}$ | 5 $\frac{9}{16}$ |
| Side, inches | 1 $\frac{3}{8}$ | 1 $\frac{1}{2}$ | 1 $\frac{13}{16}$ | 2 $\frac{1}{8}$ |
| Per dozen | .75 | .80 | 1.00 | 1.50 |
- For other **SAMPLE BOTTLES and JARS**, see Jars, Sample; also Boxes, Sample.
- BOTTLES, Vacuum or Thermos**, see Vacuum Bottles.
- BOTTLES, Sterilizer**, see No. 12391.
1764. **BOTTLES, Volatile Liquid**, glass stoppered with ground-on glass cap.
- | | | | | |
|------------------|-----|-----|------|------|
| Capacity, ounces | 2 | 4 | 8 | 16 |
| Each | .75 | .90 | 1.10 | 1.50 |
1766. **BOTTLES, Washing**, with heavy neck, fitted with rubber stopper and movable delivery tube.
- | | | | | | | |
|------------------|-----|-----|-----|-----|-----|------|
| Capacity, ounces | 8 | 12 | 16 | 24 | 32 | 64 |
| Each | .45 | .50 | .55 | .60 | .65 | 1.20 |

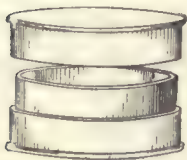


1768.	BOTTLES, Washing, of Pyrex glass, with neck covered with wicker, for use with hot water.			
	Capacity, ounces.....	16	32	
	Each	\$1.10	1.25	
1770.	BOTTLES, Washing, all of glass, with ground connections, for ether.			
	Capacity, ounces.....	8	16	32
	Each	1.35	1.65	2.20
1772.	BOTTLES, Washing, with ground connections and stop-cocks, for use with volatile liquids.			
	Capacity, ounces.....	8	16	32
	Each	4.80	5.00	5.50
1774.	BOTTLES, Washing, with Griffin's tube, for continuous flow.			
	Capacity, ounces.....	8	16	32
	Each	1.50	1.60	1.75
1776.	GRIFFIN'S TUBE only No. 1774.			
				1.00
1778.	BOTTLES, Gas Washing, see Gas Washing Bottles.			
1778.	BOTTLES, Water Sample, 2 ounce capacity, with flat ground in stopper. Both stopper and bottle may be obtained numbered serially. In ordering, specify plain or numbered bottles, and if the latter, state the series of numbers desired.			
	No.	A	B	
	Style	plain	numbered	
	Each .....	.20	.30	
	Per dozen.....	2.20	3.25	
	BOTTLES, Water, of stoneware, see Jars, Stoneware.			
1780.	BOTTLES, Wax or Ceresine, for hydrofluoric acid.			
	Capacity, cc.....	30	125	250 500
	Each .....	.25	.50	.60 .80
1782.	BOTTLES, Weighing, conical form, very light, ground-in glass stoppers.			
	Capacity, cc.....	15	30	60
	Each .....	.40	.50	.60
1784.	BOTTLES, Weighing, high form, flat bottom, without neck, ground-in glass stoppers.			
	No.	A	B	C D E
	Height, mm.....	50	60	80 90 100
	Diameter, mm.....	15	10	15 18 25
	Each .....	.30	.30	.30 .40 .50
1786.	BOTTLES, Weighing, low form, flat bottom, without neck, ground-in glass stoppers.			
	No.	A	B	C D E F G
	Height, mm.....	40	50	50 60 60 80
	Diameter, mm.....	25	25	30 40 30 50 40
	Each .....	.38	.44	.50 .55 .50 .75 .70
1788.	BOTTLES, Weighing, extra wide, flat bottom, without neck, ground-in glass stoppers.			
	No.	A	B	C
	Height, mm.....	30	30	30
	Diameter, mm.....	50	65	70
	Each	1.10	1.60	2.00



1790.	BOTTLE, Weighing Tube, set of two telescoping tubes, each 5 cm long inside, with ring handle on inside tube.....	\$0.25				
1792.	BOTTLE, Weighing, Parr's, with cover ground outside, as used in coal analysis. Diameter 25 mm; height, 20 mm.....	.60				
1794.	BOTTLE, Weighing Pipette, Grethen's Form, with glass stop-cock, for fuming acids; capacity, 2 cc.....	2.50				
1796.	BOTTLE, Weighing Pipette, Lunge's, with two stop-cocks, for fuming acids, etc. Capacity, about 15 cc.....	4.50				
1798.	BOTTLES, Woulff's, of heavy glass, with two necks.					
	Capacity, cc.....	125	250	500	1000	2000
	Each.....	.80	1.10	1.40	1.90	3.30
1800.	BOTTLES, Woulff's, of heavy glass, with three necks.					
	Each.....	.90	1.30	1.60	2.20	3.50
1802.	BOTTLES, Woulff's, of heavy glass with two necks and tubulature at bottom.					
	Capacity, cc.....	250	500	1000	2000	
	Each.....	1.40	1.80	2.50	3.80	
1804.	BOTTLES, Woulff's, of heavy glass, with three necks and tubulature at bottom.					
	Capacity, cc.....	250	500	1000	2000	
	Each.....	1.60	2.00	2.75	4.10	
1806.	BOTTLES, Woulff's, of heavy glass, with three necks, with stopper and delivery tubes ground in.					
	Capacity, cc.....	250	500	1000		
	Each.....	3.30	4.25	5.00		
1808.	BOTTLE REST, Hard Rubber, for use under acid bottles, etc., for protecting table tops. Diameter inside, 3¼ inches. Will take bottles up to 32 ounce or 1 liter.....	.20				
1814.	BOWL, Porcelain, so-called pint size. Used in washing out gluten in flour analysis.....	.35				
1816.	BOXES, Aluminum, with aluminum screw top, 2¾ inches in diameter by 2½ inches high.					
	Each.....	.40				
1817.	BOXES, Aluminum, same as No. 1816, but with box and cover numbered. In ordering state what numbers are desired.....	.45				
1820.	BOXES, Aluminum, with aluminum top. The diameter of these boxes is uniform so that the cover fits the bottom of the box, making it possible to keep box and cover together while the box is open.					
	No.....	A	B	C		
	Diameter, inches.....	2	2½	3½		
	Height, inches.....	7⁄8	1¾	2		
	Each.....	.25	.30	.50		
1821.	BOXES, Aluminum, same as No. 1820, but with box and cover numbered. In ordering state what numbers are desired.					
	No.....	A	B	C		
	Diameter, inches.....	2	2½	3½		
	Height, inches.....	7⁄8	1¾	2		
	Each.....	.30	.35	.55		

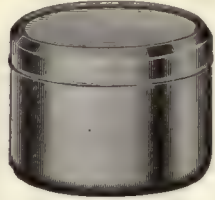
BOXES, Glass, see Jars, Sample.



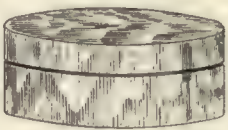
No. 1824.



No. 1826.



No. 1828.



No. 1830.

1824. BOXES, Pasteboard, round, telescope form.						
No.	A	B	C	D	E	F
Diameter, inches.....	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2 $\frac{1}{16}$	2 $\frac{7}{16}$	2 $\frac{3}{4}$
Depth, inches.....	$\frac{7}{16}$	$\frac{9}{16}$	1 $\frac{1}{16}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Per dozen.....	.15	.17	.20	.55	.60	.70
Per gross.....	\$1.50	1.70	2.00	5.50	6.00	7.00

1826. BOXES, Pasteboard, rectangular, slide form, white.						
No.	A	B	C			
Length, inches.....	2 $\frac{5}{16}$	2 $\frac{9}{16}$	2 $\frac{3}{4}$			
Width, inches.....	1 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{15}{16}$			
Depth, inches.....	1 $\frac{1}{16}$	1 $\frac{3}{16}$	1 $\frac{5}{16}$			
Per dozen.....	.14	.16	.18			
Per gross.....	1.40	1.60	1.80			

BOXES, Slide, see Slide Boxes.
BOXES, Soil Sample, see Soil Analysis Apparatus.

1828. BOXES, Seamless Tin, round, very convenient for samples. Widely used in asphalt laboratories.						
Capacity, ounces.....	$\frac{1}{2}$	1	2	4	8	16
Per dozen.....	.25	.30	.50	.70	1.00	1.60
Per gross.....	2.20	2.90	4.60	7.50	11.00	18.50

1830. BOXES, Turned Wood, plain, for samples.						
Capacity, ounces.....	$\frac{1}{2}$	1	2	4		
Per dozen.....	.30	.40	.55	1.00		
Per gross.....	2.65	3.70	5.64	10.30		



No. 1832.



No. 1840.



No. 1834.



No. 1842.



No. 1836.



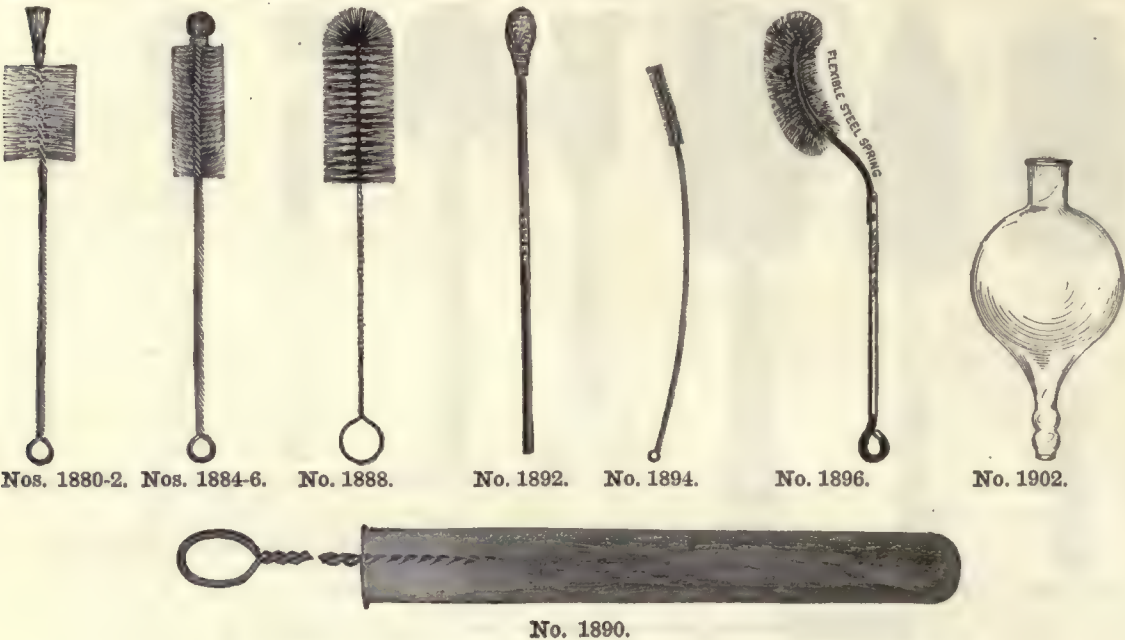
No. 1838.

BRUSHES

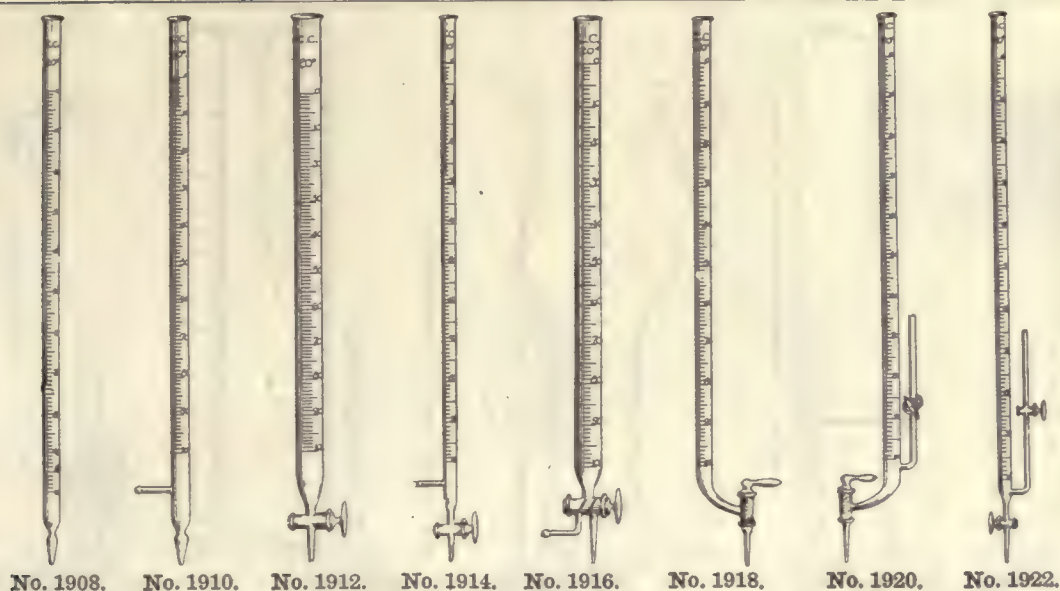
1832. BRUSH, Assay, of bristle, for lead buttons.....	.60
1834. BRUSH, Beaker, with wood handle and black bristles. Length of bristle part, 3 inches; diameter, 2 inches; total length, 11 $\frac{1}{2}$ inches.....	.20
1836. BRUSHES, Bottle, bristle end, brass wire, white bristles.	
No.	A B
Total length, inches.....	12 20
Length of brush part, inches.....	4 5 $\frac{1}{2}$
Diameter of brush part, inches.....	2 $\frac{1}{4}$ 2 $\frac{3}{8}$
Each .....	.20 .25
1838. BRUSHES, Burette, tinned wire, white bristles. No.....	A B
For burettes, cc.....	10 & 25 50 & 100
Total length, inches.....	24 36
Length of bristle part, inches.....	3 3 $\frac{1}{4}$
Diameter of bristle part, inches.....	$\frac{1}{2}$ $\frac{3}{4}$
Each .....	.08 .10
1840. BRUSH, Counter Dusting, wooden handle, five rows unbleached bristles. Length of bristle part, 8 inches; width, 2 $\frac{1}{2}$ inches; total length, 13 $\frac{3}{8}$ inches .....	.60
1842. BRUSH, Cylinder or Jar, with wooden handle and four rows black bristles. Length of bristle part, 5 inches; diameter, 2 $\frac{1}{4}$ inches; total length, 12 inches.....	.20



- No. 1876.**
1844. BRUSH, Cylinder or Jar, with wooden handle and black bristles. Length of bristle part, $4\frac{1}{2}$ inches; diameter, $2\frac{1}{4}$ inches; total length, 12 inches..... \$0.25
1846. BRUSH, Cylinder or Jar, with wooden handle and four rows of black bristles, with tufted end. Length of bristle part, 5 inches; diameter, $2\frac{1}{4}$ inches; total length, 12 inches..... .25
1848. BRUSH, Cylinder or Jar, with wooden handle and four rows of black and white bristles, with two tufts set at angle for reaching corners of large bottles, cylinders and jars. Length of bristle part, $4\frac{1}{2}$ inches; diameter, $2\frac{1}{2}$ inches; length over all, 12 inches..... .35
1850. BRUSH, Dusting, flat for ore plates, etc.; bristles, $1\frac{3}{4}$ inches in length, metal bound.
Width of bristle part, inches..... 1 2 3
Each12 .20 .30
1852. BRUSH, Funnel, taper end, black bristle, wooden handle. Length of bristle part, 3 inches; diameter at large end, $2\frac{3}{4}$ inches; total length, $11\frac{1}{4}$ inches..... .18
1854. BRUSH, Lacquer, of best camel's hair, metal bound, $\frac{1}{2}$ inch wide..... .10
1856. BRUSHES, Milk Bottle, for bottles with necks not less than $\frac{3}{16}$ inch in diameter. Each06
Per dozen60
1858. BRUSHES, Milk Bottle, for bottles with neck not less than $\frac{1}{4}$ inch in diameter. Each08
Per dozen80
1860. BRUSHES, Cream Bottle, for bottles with necks not less than $\frac{3}{8}$ inch in diameter. Each10
Per dozen 1.00
1862. BRUSHES, Cream Bottle, for bottles with necks not less than $\frac{1}{2}$ inch in diameter. Each10
Per dozen 1.00
1866. BRUSHES, Pencil, of camel's hair bound in quill. Size..... small medium large
Per dozen30 .45 .50
1868. BRUSHES, Pencil, of camel's hair, quill handles, silk bound.
Length of hair, mm..... 14 18 22
Each10 .12 .13
Per dozen 1.00 1.20 1.25
1870. BRUSH, Pipette, for use in cleaning volumetric, Mohr's or milk pipettes..... .15
1872. BRUSHES, Scale Pan, of camel's hair, wooden handle, metal bound. Length of hair, about 1 inch.
Width of hair part, inches..... $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2
Each16 .22 .30 .36
1874. BRUSH, Scale Pan, of camel's hair, round, with wooden handle. Diameter of hair part $\frac{1}{2}$ inch40
1876. BRUSH, Soil Percolation Tube, for cleaning tubes used in soil testing. Of unbleached bristles, with tufted end, and wooden handle. Length of bristle part, 7 inches; diameter, 2 inches; length over all, 3 feet 9 inches..... .60
1878. BRUSH, Soil Sampling Tube, for cleaning tubes used in sampling soils. Of stiff vegetable fiber with strong twisted wire handle. Length of bristle part, $4\frac{1}{2}$ inches; diameter, $1\frac{1}{8}$ inches; total length, 65 inches..... .25

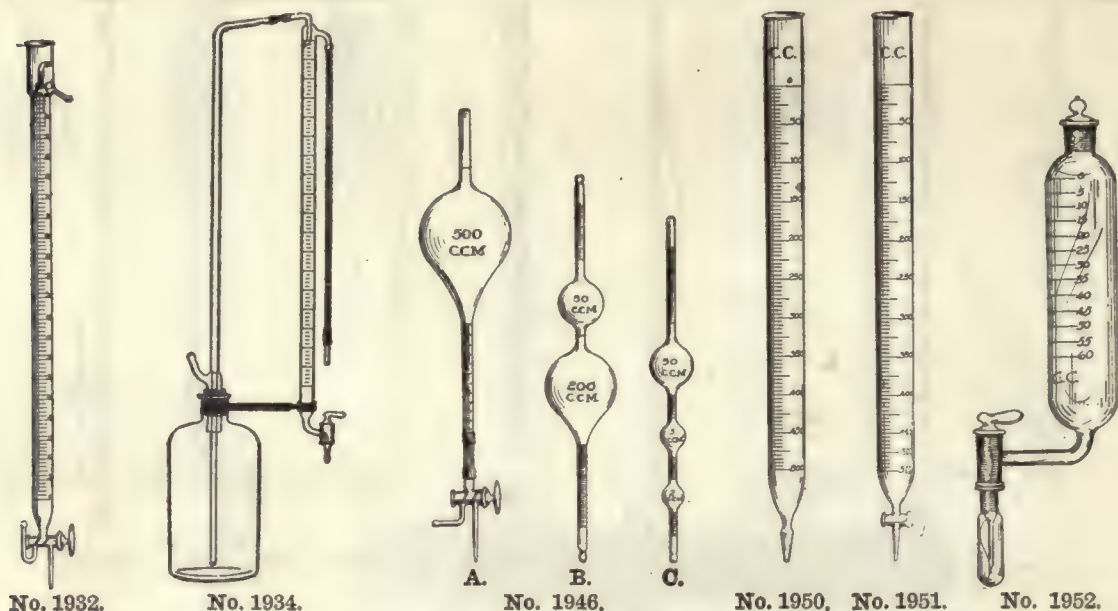


1880. **BRUSH, Test Tube**, bristle end, brass wire. Length of bristle part over all, $4\frac{1}{4}$ inches; diameter, $1\frac{3}{8}$ inches; total length, $10\frac{3}{4}$ inches.....**Each** \$0.09
Per dozen .85
1882. **BRUSH, Test Tube**, same as No. 1880, but with tinned wire.....**Each** .05
Per dozen .45
1884. **BRUSH, Test Tube**, sponge end, brass wire, for test tubes $\frac{5}{8}$ inch or larger in diameter. Length of bristle part including sponge, $3\frac{1}{2}$ inches; diameter, $1\frac{3}{8}$ inches; total length, 11 inches.
Each .09
Per dozen .90
1886. **BRUSH, Test Tube**, same as No. 1884, but with tinned wire.....**Each** .05
Per dozen .60
1888. **BRUSH, Test Tube**, tufted end, tinned wire. Length of bristle part, $3\frac{1}{2}$ inches; diameter, 1 inch; total length, 10 inches. This brush is much superior to the ordinarily so-called tufted end brushes, in which the wire projects at the end making it impossible to clean the bottom of the test tube without breakage. Length of bristle part, $3\frac{1}{2}$ inches; diameter, $1\frac{1}{4}$ inches; total length, $10\frac{1}{2}$ inches.....**Each** .05
Per dozen .50
1890. **BRUSHES, Test Tube, Dolbey's** (Patented), with tuft of bristles so constructed as to reach all parts of tube, yet affording the most perfect protection to the tube from breakage by the wire end. This is the best test tube brush made and we heartily recommend it to laboratory workers who have been looking for something better than the old style brush with the constant annoyance from breakage or imperfect cleansing.
- | No. | A | B | C |
|---------------------------------------|--------------------------------|--------------------------------|-----------------|
| Total length, inches..... | 9 | $13\frac{1}{2}$ | $13\frac{1}{2}$ |
| Length of bristle part, inches..... | $2\frac{1}{2}$ | 4 | 4 |
| Diameter of bristle part, inches..... | $\frac{3}{4}$ | 1 | $1\frac{1}{4}$ |
| For test tubes, diameter, inches..... | $\frac{3}{8}$ to $\frac{1}{2}$ | $\frac{5}{8}$ to $\frac{3}{4}$ | 1 or larger |
| Each | .09 | .11 | .12 |
| Per dozen | .90 | 1.15 | 1.20 |
1892. **BRUSHES, Test Tube, Probangs**, with rattan handle and sponge end. Length over all, 9 inches.
.....**Each** .10
Per dozen 1.00
1894. **BRUSHES, Tube**, for small tubes and funnel stems, of bristle on tinned wire. Length of bristle part, 2 inches; diameter, $\frac{1}{2}$ inch; total length, $12\frac{1}{2}$ inches**Per dozen** .20
1896. **BRUSHES, Volumetric Flask**, with flexible steel spring enabling the brush to reach every part of flask. No.....**A** **B** **C**
For flasks, capacity, cc..... 250 500 1000
Each25 .30 .35
- BULBS, Absorption**, see Absorption Bulbs; Potash Bulbs.
1902. **BULBS, Leveling**, of glass, for use in gas analysis.
Capacity, cc..... 250 500
Each55 .75
- BULBS, Nitrogen or Kjeldahl**, see Nitrogen Apparatus.
- BULBS, Rubber**, see Rubber Bulbs.



BURETTES

1908.	BURETTES , for pinchcock, without fittings. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....	10	25	50	100
	Each	\$0.45	.60	.90	1.40
	ATTACHMENT for No. 1908, see Burette Accessories.				
1910.	BURETTES , for pinchcock, with side tube for refilling, without fittings. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....	10	25	50	100
	Each .....	.60	.75	1.05	1.60
	ATTACHMENT for No. 1910, see Burette Accessories.				
1912.	BURETTES , with straight glass stopcock. Graduated in $\frac{1}{10}$ cc.				
	Capacity, cc.....	10	25	50	100
	Each	1.40	1.70	1.90	2.75
1914.	BURETTES , with straight glass stop-cock and side tube for refilling. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....	10	25	50	100
	Each	1.60	1.90	2.10	2.95
1916.	BURETTES , with three-way stop-cock. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		4.00	4.30	5.00
1918.	BURETTES , with Fresenius stop-cock. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		2.50	2.70	3.50
1920.	BURETTES , with Fresenius stop-cock and side tube with glass stop-cock in same, for refilling, according to Gawalowski. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		4.50	4.75	5.50
1922.	BURETTES , with straight glass stop-cock to operate with left hand, and side tube with glass stop-cock in same, for refilling, according to Gawalowski. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		4.50	4.75	5.50
1924.	BURETTES , Schellbach, for pinchcock, with blue line on white background to facilitate reading of meniscus; without fittings. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		2.20	2.50	3.80
1926.	BURETTES , Schellbach, for pinchcock, with side tube for refilling, with blue line as in No. 1924, without fittings. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		2.40	2.70	4.20
1928.	BURETTES , Schellbach, with straight glass stop-cock. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		3.00	3.50	5.00
1930.	BURETTES , Schellbach, with three-way stop-cock. Graduated in $\frac{1}{10}$ cc divisions.				
	Capacity, cc.....		25	50	100
	Each		5.00	5.50	6.75



1932.	BURETTES, Schellbach, Automatic, with zero point and overflow cup. With three-way stop-cock, for refilling from reservoir. Graduated in $\frac{1}{10}$ cc divisions.			
	Capacity, cc.....	25	50	100
	Each	\$6.00	7.00	8.00
1934.	BURETTES, Automatic, Squibb's, consisting of a Schellbach burette with Fresenius stop-cock mounted on reservoir. Complete with reservoir, clamp and suction tube, but without pressure bulb. Capacity of burette, 50 cc. Graduated in $\frac{1}{10}$ cc divisions.....			9.00
1935.	BURETTE only of No. 1934.....			5.40
1936.	CLAMP only of No. 1934.....			.75
1946.	BURETTES, Calibrating, Morse's, for flasks, burettes, and pipettes.			
	No.	A	B	C
	Capacity of bulbs, cc.....	500	200 & 50	50, 3 & 2
	Each	10.50	6.75	7.50
1947.	STOP-COCK, three-way, for No. 1946.....			3.50
1948.	BURETTE, Calibrating, Morse's, 1 cc, with three-way stop-cock, for small quantities...			6.00
1950.	BURETTES, Dispensing, for pinchcock, without fittings.			
	Capacity, cc.....	250	500	1000
	Graduated in, cc.....	1	5	10
	Each	4.00	4.50	5.50
1951.	BURETTES, Dispensing, with straight glass stop-cock.			
	Capacity, cc.....	250	500	1000
	Graduated in, cc.....	1	5	10
	Each	5.40	5.60	7.00
1952.	BURETTE, Weighing, Ripper's, arranged for suspending from balance hook by aluminum wire. Graduated to 60 cc in 5 cc divisions.....			3.50

BURETTES, PRECISION

1958.	BURETTES, Precision or Normal, for pinchcock, graduated to meet the requirements of the United States Bureau of Standards. With unofficial factory certificate. Without fittings.				
	Capacity, cc.....	10	25	50	100
	Graduated in, cc.....	$\frac{1}{20}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$
	Each	2.60	3.00	3.70	4.50
1960.	BURETTES, Precision or Normal, with straight glass stop-cock with tip curved. Graduated to meet the requirements of the United States Bureau of Standards. With unofficial factory certificate.				
	Capacity, cc.....	25	50	100	
	Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$
	Each	4.10	4.80	5.20	
1962.	BURETTES, Precision or Normal, with straight glass stop-cock with curved tip, tested by the United States Bureau of Standards. With control stamp and certificate of corrections.				
	Capacity, cc.....	25	50	100	
	Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$
	Each	7.75	8.35	9.00	



No. 1968.



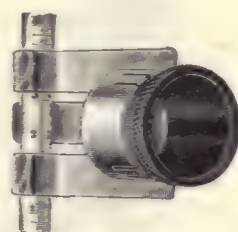
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No. 1976.



No. 1982.



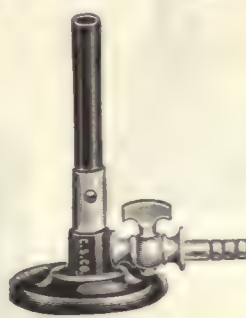
No. 1984.



No. 1990.



No. 1992.



No. 1996.



No. 1998.



No. 2000.

1964. **BURETTES**, Precision or Normal, with Fresenius stop-cock, graduated to meet the requirements of the United States Bureau of Standards. With unofficial factory certificate.

Capacity, cc.....	25	50	100
Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$
Each	\$4.10	4.80	5.20

1966. **BURETTES**, Precision or Normal, with Fresenius stop-cock, tested by the United States Bureau of Standards. With control stamp and certificate of corrections.

Capacity, cc.....	25	50	100
Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$
Each	7.75	8.25	9.00

BURETTE ACCESSORIES

1968. **BURETTE ATTACHMENT**, consisting of glass tip with rubber connection and pinch-cock .25
 1970. **BURETTE ATTACHMENT**, three-way, for refilling from reservoir. Complete with glass tip, T-tube, rubber connection, and two pinch-cocks50
 1971. **GLASS TIPS** only for Nos. 1968-70.....per dozen .30

1976. **BURETTE CAPS**, to protect inside of burettes from dust.

No.	A	B	C
For burettes, cc.....	25	50	100
Each .....	.05	.05	.05
Per dozen.....	.50	.50	.50

1982. **BURETTE FUNNEL**, 1 inch in diameter, for use in filling burettes..... .20

1984. **BURETTE MENISCUS READER**, consisting of a nickel-plated brass clamp to fasten on the burette, with adjustable eyepiece..... 2.00

BURNERS FOR GASEOUS FUELS

Acetylene.

1990. **BURNER**, Bunsen, for acetylene gas. Height of burner, $5\frac{1}{2}$ inches; diameter of tube, $\frac{9}{16}$ inch 2.25

Coal Gas.

1992. **BURNER**, Bunsen, with air regulator and slot-shaped nipple which can easily be adjusted to suit the local conditions of gas pressure. Height, $5\frac{1}{2}$ inches; diameter of tube, $\frac{7}{16}$ inch. Finished in oxidized brass with japanned base..... .40

1994. **BURNER**, Bunsen, similar to No. 1992 but larger in size. Height, $5\frac{1}{2}$ inches; diameter of tube, $\frac{1}{2}$ inch50

1996. **BURNER**, Bunsen, similar to No. 1992, but provided with stop-cock on gas inlet tube. Height, $5\frac{1}{2}$ inches; diameter of tube, $\frac{7}{16}$ inch..... 1.25

1998. **BURNER**, Bunsen, same as No. 1992, without base, and with stop-cock, for screwing into gas pipe. Convenient for constructing digestion shelves, etc. Total length, 6 inches; diameter, $\frac{7}{16}$ inch..... 1.00

2000. **BURNER**, Bunsen, with stop-cock and pilot flame. Height, 6 inches; diameter of tube, $\frac{1}{2}$ inch 2.30



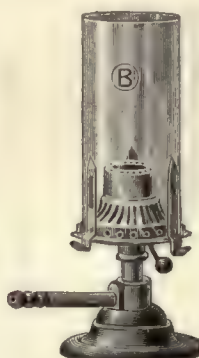
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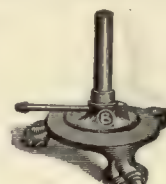
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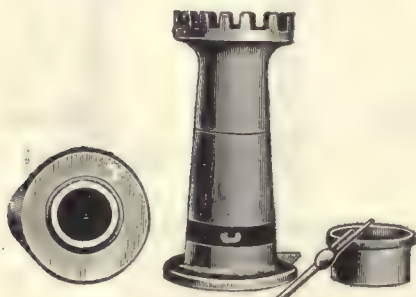
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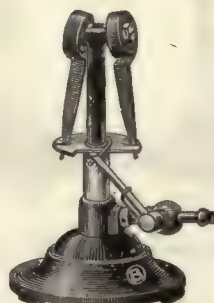
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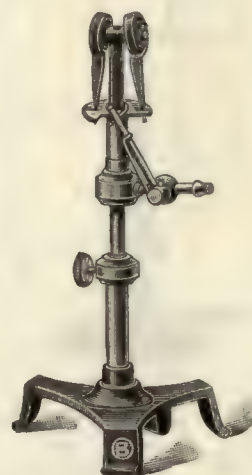
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No. 2028.

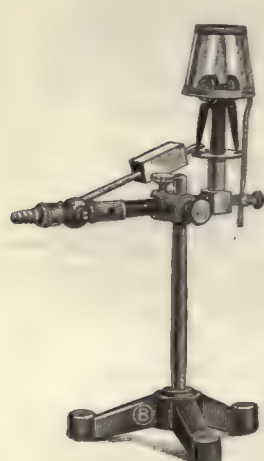


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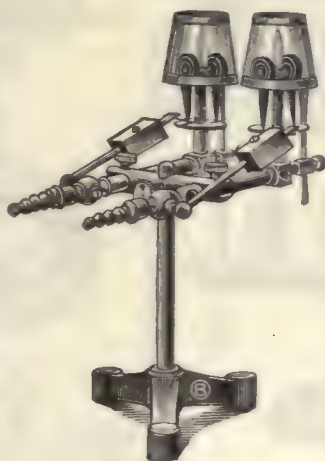


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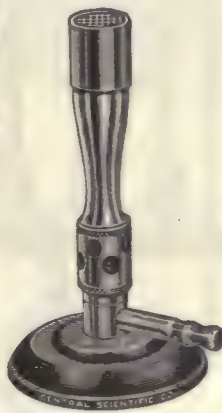
2002. **BURNERS**, Bunsen, Central Draft, an excellent burner for elementary student use. Substances accidentally dropped in tube will fall through without clogging gas inlet. Height, $5\frac{3}{4}$ inches; diameter of tube, $\frac{7}{16}$ inch. Each \$0.32
Per dozen 3.20
2004. **BURNER**, Bunsen, Central Draft, same as No. 2002, with air regulator. Height, $5\frac{3}{4}$ inches; diameter of tube, $\frac{7}{16}$ inch.35
2006. **BURNER**, Bunsen, Central Draft, for use with gasoline gas, fitted with air regulator. Height, $5\frac{3}{4}$ inches; diameter of tube, $\frac{9}{16}$ inch.40
2008. **BURNER**, Bunsen, low form, with air regulator. Length, $5\frac{1}{2}$ inches; height, 3 inches; diameter of tube, $\frac{7}{16}$ inch.60
2010. **BURNER**, Bunsen, micro form, nickel-plated, 2 inches high, tube $\frac{1}{4}$ inch in diameter.60
2012. **BURNER**, Bunsen, micro form, nickel-plated 3 inches high, tube $\frac{3}{8}$ inch in diameter.35
2014. **BURNER**, Argand, adjustable flame, with copper chimney. Especially desirable where uniform temperature is essential. Total height including chimney, 7 inches. 1.85
2016. **BURNER**, Argand, with glass chimney 7 inches high; total height, 10 inches. 1.50
2020. **BURNER**, Argand, with mica chimney 8 inches high; total height, 11 inches. 1.60
2023. **CHIMNEY** for Argand Burners, of copper. Height, 4 inches; diameter, 2 inches.20
2820. **CHIMNEY** for Argand Burners, of glass. Height, 7 inches; diameter, 2 inches. Each .12
Per dozen 1.20
2025. **CHIMNEY** for Argand Burners, of mica. Height, 8 inches; diameter, 2 inches.30
2028. **BURNER**, Chaddock's, made of porcelain and white fire clay, incorrodible and extremely durable. Intended especially for use in hoods, where metal burners corrode. No support or wire gauze necessary. Complete with air regulator, support for dishes, chimney for triangles, asbestos disk and rings. Height including dish support, 9 inches; outside diameter of dish support 4 inches. 4.50
2029. **DISH SUPPORT**, or Castle Top, for No. 2028.70
2030. **CHIMNEY** for triangles, for No. 2028.30
2034. **BURNERS**, Koch Safety, with automatic valve to shut off gas when flame is extinguished. Valve is operated by spring controlled by expansion and contraction of metallic spirals. Especially desirable in heating incubators or other apparatus where flame must be kept in operation over long periods of time. With threaded inlet for attaching metallic tubing.
- | | | |
|-----------------------------------|----------------|----------------|
| No. | A | B |
| Height, inches. | 5 | 6 |
| Diameter of tube, inches. | $\frac{5}{16}$ | $\frac{7}{16}$ |
| Each | 6.50 | 7.00 |
2036. **BURNERS**, Koch Safety, same as No. 2034, but on stand adjustable in height.
- | | | |
|--------------------------------|------|-------|
| No. | A | B |
| Height, inches. | 9 | 10 |
| Adjustable to, inches. | 13 | 14 |
| Each | 9.20 | 10.00 |



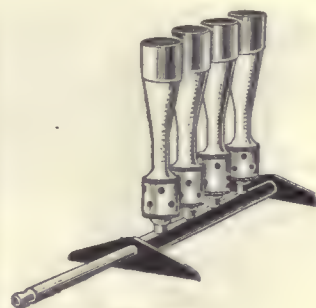
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No. 2040.



No. 2044.



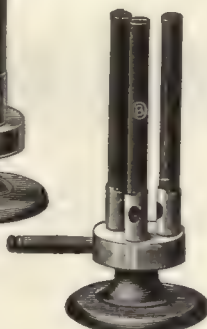
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No. 2041.



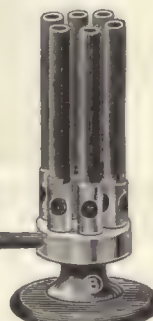
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No. 2054.



No. 2056.

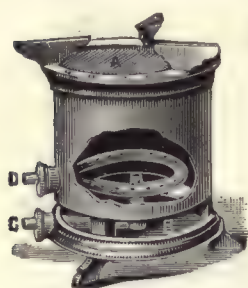


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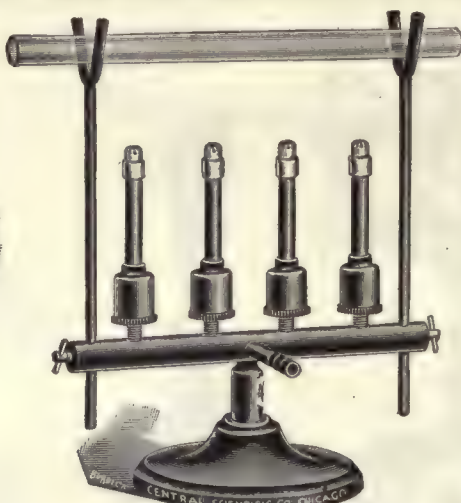


No. 2064.

2038. **BURNER, Koch Safety**, large size, with weight release instead of spring, insuring more perfect operation. With mica chimney to protect flame from draft. On stand adjustable horizontally as well as vertically..... \$15.00
2040. **BURNER, Koch Safety**, same as No. 2038, but with two burners mounted on same stand. Each burner is provided with mica chimney, and can be adjusted horizontally. Vertical adjustment common to both..... 21.00
2041. **MICA CHIMNEY**, with clamp to attach to Koch Safety and other burners..... 1.70
- BURNERS, Meker**, a very powerful burner designed on scientific principles which eliminates entirely the cold Bunsen cone and gives a flame that is practically a homogeneous mass of burning gas with a temperature that is nearly uniform throughout. No. 0 is the students' form; Nos. 1 and 2 are to be used instead of the Bunsen Burner; No. 3, the general laboratory type; Nos. 4 and 5, to replace the blast lamp.
- | No. | 0 | 1 | 2 | 3 | 4 | 5 |
|--|------|------|------|------|------|------|
| Height of burner, mm..... | 115 | 115 | 130 | 155 | 190 | 250 |
| Diameter of flame, mm..... | 16 | 16 | 20 | 25 | 30 | 43 |
| 2044. For artificial gas..... | 1.70 | 1.80 | 2.00 | 2.60 | 3.10 | 6.50 |
| 2045. For natural or gasoline gas..... | .... | 1.80 | 2.00 | 2.60 | 3.10 | 6.50 |
- BURNERS, Meker, Multiple Tube**, with four No. 3 burners mounted on a common tube. Very useful in heating combustion or muffle furnaces.
- | | |
|---|-------|
| 2048. For artificial gas..... | 16.00 |
| 2049. For natural or gasoline gas..... | 19.25 |
| 2052. BURNER, Multiple Tube , same as No. 1992, with two tubes on same base. Height, 6 inches; diameter of tubes, $\frac{7}{16}$ inch..... | 2.30 |
| 2054. BURNER, Multiple Tube , three tubes in circle. Height 6 inches, diameter of tubes $\frac{7}{16}$ inch..... | 2.85 |
| 2056. BURNER, Multiple Tube , four tubes in circle. Height 6 inches, diameter of tubes $\frac{7}{16}$ inch..... | 3.00 |
| 2058. BURNER, Multiple Tube , six tubes in circle. Height 6 inches, diameter of tubes $\frac{7}{16}$ inch..... | 4.00 |
| 2062. BURNER, Multiple Tube , four tubes in row. Height 6 inches, diameter of tubes $\frac{7}{16}$ inch..... | 2.90 |
| 2064. BURNER, Multiple Tube , four tubes in row, each with stop-cock. Height $7\frac{3}{4}$ inches, diameter of tubes $\frac{7}{16}$ inch..... | 6.90 |



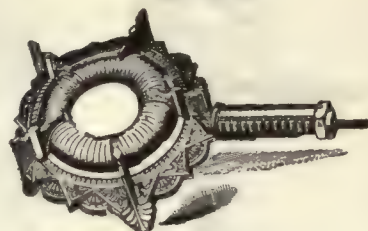
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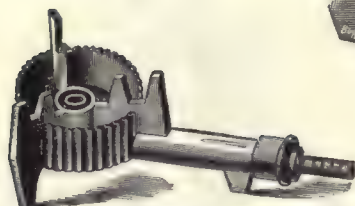
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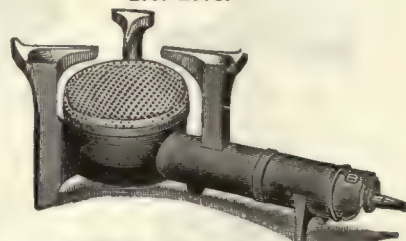
No. 2070.



No. 2078.



No. 2068.

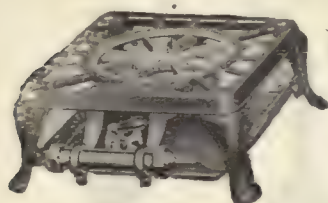


No. 2082.

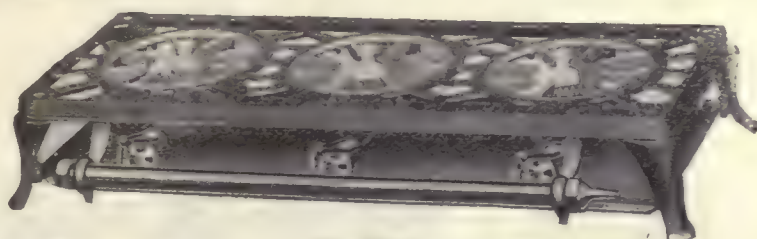
2066. **BURNERS, Bunsen (Simple Combustion Furnace).** Consists of four adjustable burners having regulators for both gas and air and burning either coal, natural or gasoline gas, mounted on a gas supply tube with forks $9\frac{1}{4}$ inches apart, adjustable through a 3-inch range, for holding combustion tubes \$13.00

Burners, Fletcher's

2068. **BURNERS, Fletcher's Argand.** A simple, indestructible burner for general work. The flame is shorter, more compact and higher in temperature than the ordinary Bunsen flame. Complete with tripod for supporting dishes, etc.
- | | | | |
|--------------------------------------|---------------|----------------|---------------|
| No. | A | B | C |
| Bore of horizontal tube, inches..... | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{3}{4}$ |
| Gas consumption per hour, feet..... | 2 | $3\frac{1}{2}$ | 7 |
| Each | .90 | 1.30 | 1.70 |
2070. **BURNERS, Fletcher's Evaporating,** made of solid copper with lap joints. An excellent burner for heating flasks or beakers, as it is free from cold spots or cold air currents, nor does the direct flame come in contact with the glass. Height, about $1\frac{1}{2}$ inches in all sizes.
- | | | | |
|-----------------------|------|------|----------------|
| No. | A | B | C |
| Diameter, inches..... | 4 | 5 | $6\frac{1}{2}$ |
| Each | 2.10 | 2.80 | 3.50 |
2072. **BURNERS, Fletcher's Evaporating,** same construction as No. 2070, but of cast iron.
- | | | | |
|-----------------------|------|------|----------------|
| No. | A | B | C |
| Diameter, inches..... | 4 | 5 | $6\frac{1}{2}$ |
| Each | 1.40 | 1.70 | 2.80 |
2074. **BURNER, Fletcher's Low Temperature,** giving a complete range of temperature from a gentle current of warm air to a clear red heat, under perfect control. For very low temperatures the ring must be lighted through the opening B. For boiling, the light is applied to the surface of the gauze, providing a large body of blue flame, the temperature of which is controlled by forcing air through blast pipe C. Total height, $6\frac{3}{4}$ inches; diameter, 5 inches; gas consumption per hour, 25 feet..... 2.80
2075. **BURNER, Fletcher's Low Temperature,** same as No. 2074 without blast pipe C..... 2.40
2078. **BURNERS, Fletcher's Radial,** of cast iron, easily cleaned.
- | | | |
|---------------------------------------|----------------|------|
| No. | A | B |
| Diameter of ring, inches..... | $3\frac{3}{4}$ | 5 |
| Diameter of stand, inches..... | $6\frac{1}{2}$ | 8 |
| Gas consumption per hour, cu. ft..... | 12 | 18 |
| Each | 2.10 | 2.80 |
2080. **BURNERS, Fletcher's Radial,** for gasoline gas, same as No. 2078, but with capnut regulator.
- | | | |
|------------|------|------|
| No. | A | B |
| Each | 3.20 | 3.80 |
2082. **BURNER, Fletcher's Solid Flame,** for quick heating of large surfaces. Diameter of flame surface, $4\frac{1}{4}$ inches; gas consumption per hour, 35 feet 2.20
2084. **BURNER, Fletcher's Solid Flame,** same as No. 2082, but for gasoline gas, with cap-nut regulator. 4.00
2085. **PERFORATED CAPS, Copper,** for Nos. 2082 and 2084.....each .75



No. 2094A.



No. 2094C.



No. 2088.



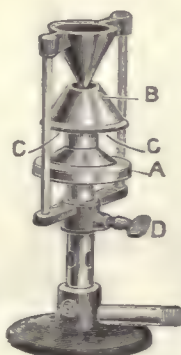
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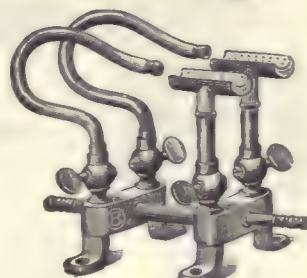
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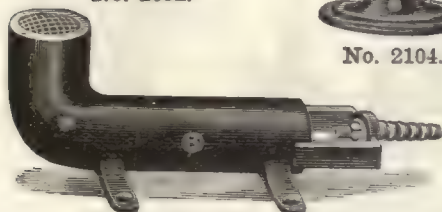
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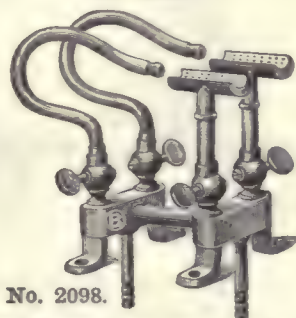
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No. 2096.



No. 2108.

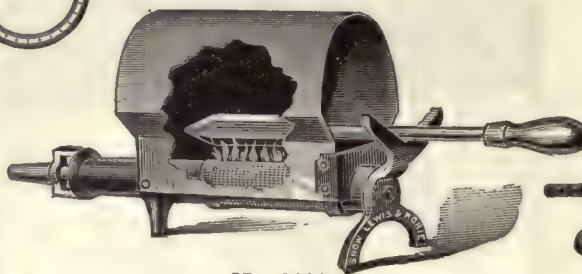


No. 2098.

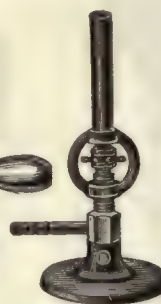
2088. **BURNER, Gas Stove**, round portable, with cast iron top and base, and Russia iron body. Steel drip pan is beneath burner and top is raised. Total height, 4 $\frac{1}{4}$ inches; diameter, 9 inches \$1.45
2090. **BURNER, Gas Stove**, same as No. 2088, with valve and air regulator for burning gasoline gas 3.75
2092. **BURNER, Gas Stove**, similar to No. 2088, but of simpler construction. Total height, 4 $\frac{1}{2}$ inches; extreme length, 12 $\frac{1}{2}$ inches; diameter across dish support, 6 inches 1.10
2094. **BURNERS, Gas Stove**, with radial burners. Finished in black japan and nickel-plate. For coal gas unless otherwise specified.
- | No. | A | B | C |
|--------------------------------|-------|-------|-------|
| Number of burners..... | 1 | 2 | 3 |
| Size of top plate, inches..... | 12x12 | 12x22 | 12x32 |
| Each | 4.60 | 7.75 | 10.30 |
2096. **BURNERS, Glass Blowers' Fires**, on base with four legs for attachment to table top, with gas and air inlet tubes horizontal.
- | No. | A | B | C |
|-----------------------|------|-------|-------|
| Number of lights..... | 1 | 2 | 3 |
| Per set of two..... | 9.00 | 14.00 | 18.00 |
2098. **BURNERS, Glass Blowers' Fires**, same as No. 2096, but with gas and air inlet tubes vertical.
- | No. | A | B | C |
|-----------------------|------|-------|-------|
| Number of lights..... | 1 | 2 | 3 |
| Per set of two..... | 9.00 | 14.00 | 18.00 |
2099. **BURNER TIP** for glass blowers' fires, concave70
2102. **BURNER, Greenman**, for use with Greenman Thermo-Regulators. So constructed that the gas cannot strike back nor can soot be deposited when flame is low. With adjustment for size of flame and threaded inlet for connection with metallic tubing..... 12.50
2103. **BURNER TUBING**, of soft brass, with $\frac{1}{8}$ inch I. P. size coupling at each end, to connect Burner No. 2102 to metal gas supply tube.
- | No. | A | B | C |
|---------------------|------|------|------|
| Length, inches..... | 30 | 48 | 60 |
| Each | 2.30 | 2.85 | 3.50 |
- BURNER TUBING**, flexible steel, see Nos. 11624 and 11626.
2104. **BURNER, Illuminating**, for table illumination, glass bending, etc. Height, 12 inches.... 1.70
2106. **BURNER, Illuminating**, similar to No. 2104, but with Welsbach burner and mica chimney, as used at the University of Chicago. Height, 10 inches from table to center of light.... 2.50
2108. **BURNER, Low Form**, extra large, with gauze top. Height, 5 inches; diameter, 2 $\frac{1}{4}$ inches; extreme length, 14 inches. A valuable burner for use in heating sterilizers and incubators 2.85



No. 2110.



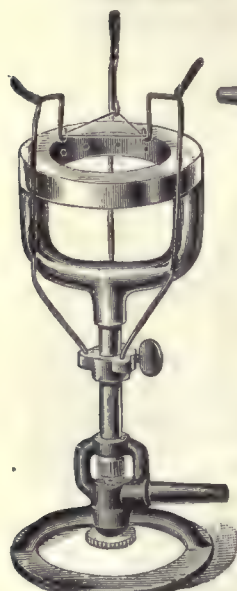
No. 2114.



No. 2120.



No. 2130.



No. 2112.



No. 2118.



No. 2124.



No. 2126.



No. 2132.



No. 2128.

2110. **BURNERS, Ring Form**, with air regulator, to be attached to support by means of a right angle clamp, such as No. 2914.

No.	A	B	C	D
Diameter, inches.....	3	4	5	6
Each	\$1.70	1.90	2.20	2.60

2112. **BURNER, Roger's Ring**, for heating platinum crucibles without bumping while evaporating strong solutions. Flame is applied to upper part of crucible only. Complete with platinum triangle of No. 26 wire..... 7.50

BURNERS, Soldering Iron Heater, simple construction, cast iron base, with Russia iron hood. Total height, 6½ inches; extreme length, 14 inches.

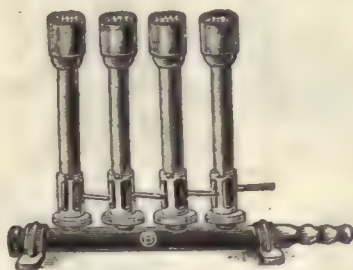
2114. For artificial gas.....	2.45
2115. For gasoline gas.....	3.50
2116. For natural gas.....	3.50

Burners, Adjustable, for Use With Coal, Gasoline or Natural Gas.

2118. **BURNER, Bunsen**, with adjustment for air and gas. Height, 6 inches; diameter of tube, 7/16 inch 1.10
2120. **BURNER, Bunsen**, adjustable, improved form. Height, 6½ inches; diameter of tube, 1/2 inch 1.70
2122. **BURNER, Bunsen**, adjustable, same as No. 2120, but without base. Length, 6¼ inches; diameter of tube, 1/2 inch..... 1.50
2124. **BURNER, Boyce's Acme Safety**, with adjustment for air and gas. Construction such that flame cannot strike back. Height, 6½ inches; diameter of tube, 7/16 inch..... 1.65
2126. **BURNER, Boyce's Adjustable**, with improved regulator for air and gas. One of the best low priced burners for coal, gasoline, or natural gas, as the tube is stationary, permitting all burner attachments to be used with it to the best advantage67
2128. **BURNER, Detroit Adjustable**, for coal, gasoline and natural gas. Height, 6 inches; diameter of tube, 1/2 inch..... 1.25
2130. **BURNERS, Teclu's**, with regulator for air and gas, furnishing a very large and hot flame.
- | No. | A | B |
|-------------------------------|------|------|
| Height of burner, inches..... | 6 | 7½ |
| Diameter of tube, inches..... | 1½ | ¾ |
| Each | 1.90 | 2.80 |
2132. **BURNER, Tirrill's**, substantially constructed, all of brass, with regulators for air and gas. Considered one of the best burners made for use with coal, natural or gasoline gas. Height, 6 inches; diameter of tube, 7/16 inch..... 1.50



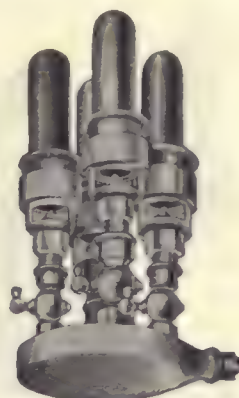
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No. 2140.



No. 2144.



No. 2146.



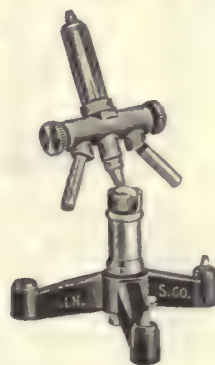
No. 2150.



No. 2152.



No. 2154.



No. 2155.

Burners, High Temperature.

2138. **BURNERS, High Temperature**, of grid type, with air and gas regulator, suitable for coal, gasoline or natural gas.

No.	A	B	C
Height, inches.....	6	6½	7
Diameter of grid, inches.....	¾	1	1½
Each	\$1.50	2.00	2.60

2140. **BURNER, High Temperature, Quadruple**, consisting of four of the No. 2138A Burners mounted on a common supply tube. Useful in heating combustion and muffle furnaces..... 10.00

2144. **BURNERS, High Temperature**, of Meeker type with adjustment for air and gas. Constructed of brass with grid top.

No.	3	4
Height of burner, inches.....	6¾	7½
Diameter of flame, mm.....	25	30
Each	3.00	3.50

2146. **BURNERS, Braun's Vulcan Non-Blast**, for coal or natural gas, for use with Braun Furnaces. These are non-blast burners operating without noise and upon regular gas pressure. They are so designed as to secure a correct mixture of gas and air to produce the most intense heat. Temperatures up to 2100°F., have been obtained. Each tube consumes about 50 cubic feet of gas per hour. Complete with regulating valve for each burner.

No.	A	B	C	D
Number of burner tubes.....	1	2	3	4
Each	3.25	7.25	10.50	12.50

Burners, Blast.

2150. **BURNER, Blast, Braun Gas**, for use with artificial or natural gas. Designed for use with Furnaces Nos. 6300 and 6398. Requires a blower to furnish sufficient amount of air. (See No. 6400). Should be connected to a ¾-inch gas supply line Shipping weight, 18 pounds. Complete with air and gas valves..... 15.50

2152. **BURNER, Blast, Bunsen's style**, with three interchangeable gas tips and with stop-cocks on gas and air inlet tube. An excellent lamp for ordinary laboratory use. Can be adjusted in height from 8 to 10 inches. **For coal gas only**..... 5.40

2154. **BURNER, Blast, Bunsen's**, extra large size, on adjustable stand, with two tips. **For coal gas only** 10.00

2155. **BURNER, Blast**, similar in construction to Bunsen's but with needle valves instead of stop-cocks. Mounted on ball and socket joint, with set of three gas tips and two sleeves. Can be used with coal, gasoline or natural gas..... 6.00



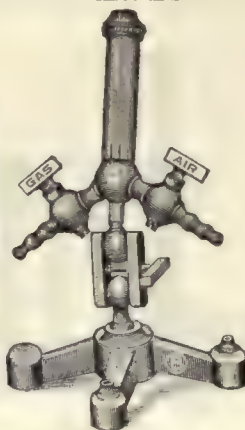
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No. 2156.



No. 2170.



No. 2162.



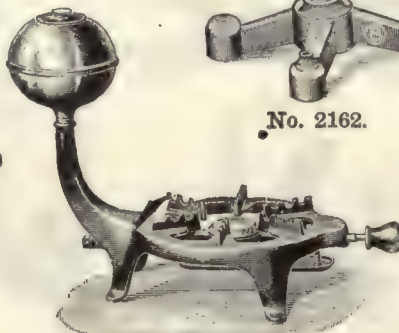
No. 2160.



No. 2182.



No. 2158.



No. 2186.



No. 2172.

2156. **BURNER, Blast, Fletcher's Compound**, with range from a delicate pointed jet to a large brush flame; mounted on adjustable heavy cast base. Flame easily controlled by lever which adjusts both air and gas automatically. Especially valuable in glass working. For coal gas only \$12.75
2158. **BURNERS, Blast, Fletcher's Injector**, for heating gas furnaces. Can be used with coal, gasoline or natural gas. No. A B
 Gas consumption per hour, feet..... 42 60
 Each 2.50 3.50
2160. **BURNERS, Blast, Meker Type**, with short inlet tube for air. For coal gas only.
 No. 2 4
 Height of burner, mm..... 135 190
 Diameter of flame, mm..... 20 30
 Each 4.70 7.00
2162. **BURNER, Blast, Wiesnegg, or French form**, with stop-cocks. Mounted on ball joint. Complete with three gas tips. For coal gas only Com. 6.50
BURNERS, Blast, Brazing, see Blowpipe No. 1444.

BURNERS FOR LIQUID FUELS

Burners, Alcohol.

2170. **BURNERS, Alcohol Lamps**, of glass, with ground cap, wick and wick holder.
 Capacity, ounces 4 8
 Each22 .36
2172. **BURNERS, Alcohol Lamps**, of brass, with screw cap, wick and wick holder.
 Capacity, ounces 4 8
 Each85 1.10
2173. **BURNER WICKS**, for alcohol burners Nos. 2170 and 2172..... Per dozen .10
2174. **BURNER WICK HOLDERS**, brass, for No. 2170 Per dozen .40
2175. **BURNER CAPS**, of glass, for No. 2170. No..... A B
 For burner, ounces..... 4 8
 Per dozen 1.00 1.00
2178. **BURNER, Alcohol Lamp**, of glass with nine facets on the font, enabling it to be placed in any position. Provided with wick ½ inch in diameter, giving a much hotter flame than ordinary alcohol lamps90
2179. **BURNER WICKS** for No. 2178..... Per dozen .50
2182. **BURNER, Barthel's Automatic**, for alcohol; requires no wick; very powerful. Flame is equivalent to 2 Bunsen burners. Complete with 1½ meters flexible steel tubing and reservoir of 1 liter capacity. Without tripod..... 10.00
2183. **FLEXIBLE TUBING** for No. 2182 in 1½ meter lengths..... Per length .60
2186. **BURNERS, Barthel's Alcohol Stove**, enameled finish with brass reservoir; no wick required. Safe, smokeless; size of flame readily adjusted. Capacity of reservoir, ½ liter.
 No. A B
 Number of burners..... 1 2
 Each 5.00 9.00



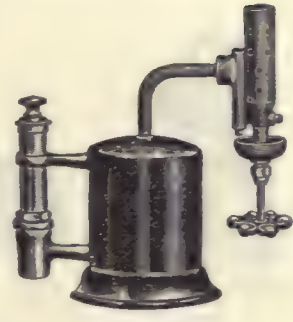
No. 2190.



No. 2192.



No. 2194.



No. 2206.



No. 2211A.



No. 2211B.



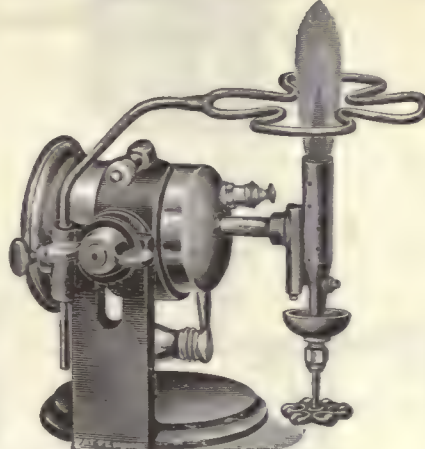
No. 2211H.



No. 2211D.



No. 2211G.



No. 2208.



No. 2200.

2190. **BURNER**, Alcohol Blast, double jet type. Produces needle pointed flame of great heat, over 3000°F. Burner swivelled so as to be turned in any position. Capacity, 1 pint; consumption, $\frac{1}{4}$ pint per hour. **\$9.35**
2192. **BURNER**, Alcohol Stove, of brass nickel-plated, with invisible, indestructible wick. Very powerful, producing no smoke or odor. Weight, 8 ounces; capacity, 7 ounces. **1.00**
2194. **BURNER**, Alcohol Stove, as used on Moisture Testers; noiseless, economical and safe. Burns with intensely hot, blue, smokeless flame for three hours on one charge. The best alcohol stove substitute for a broad gas flame. Flame adjustable in height. **3.50**

Burners, Gasoline and Kerosene.

2200. **BURNER**, Baby Gasoline Torch, of brass, nickel-plated. Fits the hand and can be used in any position. Automatic in action, without valves or pump. Burns two hours with one filling. Capacity of reservoir, 1 pint. **1.65**

REPAIR PARTS FOR No. 2200.

- | | | | |
|-----------------------------|-----|----------------------------|------|
| 2201A. Burner Tube | .35 | 2201D. Straight Neck | .85 |
| 2201B. Tip Nut | .35 | 2201E. Fiber Washer | .05 |
| 2201C. Cleaning wire | .08 | 2201F. Tank | 1.30 |
| 2201G. Wick and Strip | | | .16 |

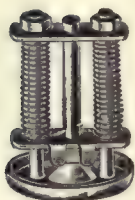
2206. **BURNER**, Laboratory Blast Lamp, for gasoline. The tank is of heavy seamless drawn brass, with brass pump in handle; the burner is of special bronze alloy. The flame is intensely hot, and can be regulated from small point to large brush. An excellent substitute for the Bunsen burner or gas blast lamp. Capacity of adjustable tank, 1 pint; total height of burner, 7 inches. **7.50**
2208. **BURNER**, Adjustable Laboratory Blast Lamp, for gasoline. Similar in construction to No. 2206, but mounted on swivel stand so that flame can be pointed in any direction, and raised or lowered. The pump is of brass mounted inside the tank and is automatic in action. Complete with adjustable tripod, which can be swung out of the way when not in use. **10.40**
2209. **BLAST LAMP** only of No. 2208. **7.00**
2210. **STAND** only of No. 2208. **4.15**

REPAIR PARTS FOR Nos. 2206 AND 2208.

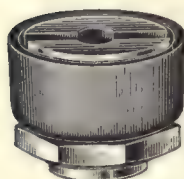
- | | |
|--|----------|
| 2211A. Burner Body, Needle and Drip Cup, for either No. 2206 or No. 2208. | 3.30 |
| 2211B. Filler Plug for either No. 2206 or No. 2208. | .45 |
| 2211C. Drip Cup for either No. 2206 or No. 2208. | .70 |
| 2211D. Feed Pipe for No. 2206. | .25 |
| 2211F. Pump for No. 2206. | 1.50 |
| 2211G. Pump for No. 2208. | 1.50 |
| 2211H. Cup Leathers for No. 2206 or No. 2208. | Each .10 |



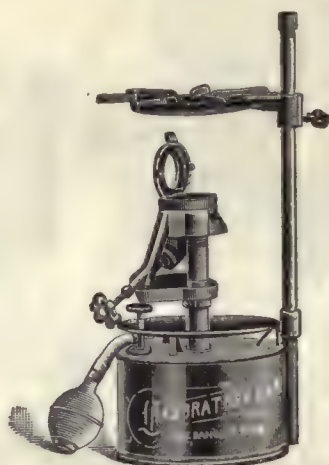
No. 2211S.



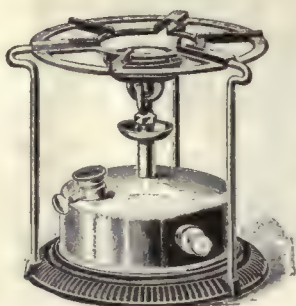
No. 2211U.



No. 2211V.



No. 2218.



No. 2220.



No. 2215.



No. 2214.

2211J. Hexagon Nuts, any size for No. 2206 or No. 2208.....	Each	\$0.05
2211K. Pump Caps for No. 2206 or No. 2208.....	Each	.12
2211L. Plunger Knobs for No. 2206 or No. 2208.....	Each	.12
2211M. Cork Washers for No. 2206 or No. 2208.....	Each	.02
2211N. Springs for No. 2206 or No. 2208.....	Each	.02
2211P. Cork Holder for No. 2206 or No. 2208.....		.10
2211Q. Spring Plates for No. 2206 or No. 2208.....	Each	.10
2211R. Plunger Rod for No. 2206 or No. 2208.....		.15
2211S. Plunger Rod, complete with knob, cap and slide for No. 2206 or No. 2208.....		.50
2211T. Pump Collar for No. 2206 or No. 2208.....		.20
2211U. Pump Bottom for No. 2206 or No. 2208.....		.50
2211V. Pump Slide for No. 2206 or No. 2208.....		.30

2214. **BURNERS**, Cary's Gasoline Blast, producing intensely hot, clean flame. Recommended for use in heating Furnaces Nos. 6390 and 6398.

No.	A	B
Diameter, inches.....	1½	2
Each	13.25	15.75

2215. **GASOLINE TANK OUTFIT** for use with No. 2214, with heavy iron tank, tinned inside and out to prevent rusting and tested to a pressure of 100 pounds. Fitted with large brass hand pump on separate base. Complete with 12 feet of ¼-inch iron pipe, pressure gage, two swivel joints, necessary valves and fittings, but without burner.

No.	A	B
Capacity of tank, gallons.....	2	7
Shipping weight, pounds.....	50	70
Each	31.50	42.00

Prices of extra parts for No. 2215 quoted on application.

2218. **BURNER**, Dangler's Gasoline Blast Lamp, flame easily adjustable. With tin reservoir, holding ½ gallon. Complete with rubber pressure bulb. Height of burner, 10½ inches; height to top of support rod, 17 inches; diameter of reservoir, 7 inches..... 9.00

BULBS, Rubber, for No. 2218, see No. 11530.

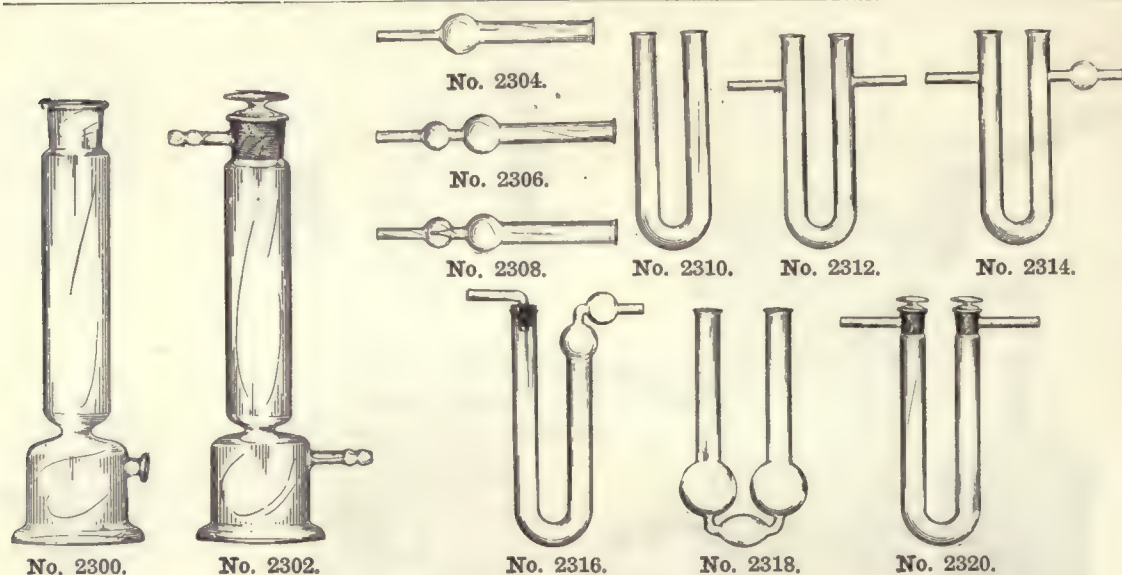
2220. **BURNER**, Kerosene Stove, wickless, giving hot blue flame, without smoke or odor. Height, 8¾ inches; diameter of base, 9 inches. Without stand..... 7.50

2221. **STAND** for No. 2220, with top 8¾ inches in diameter..... .90



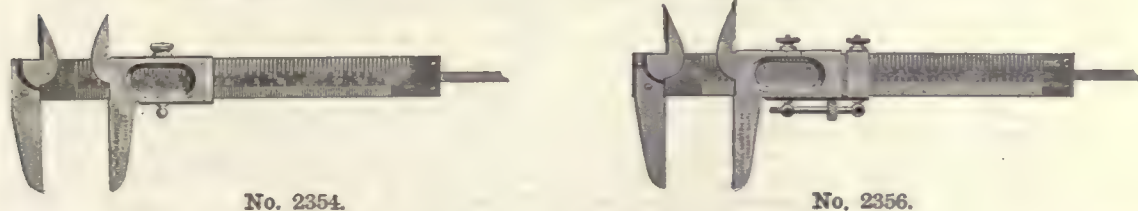
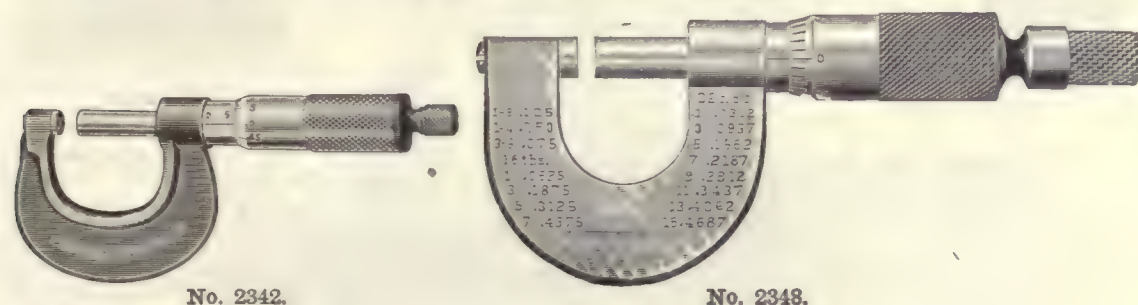
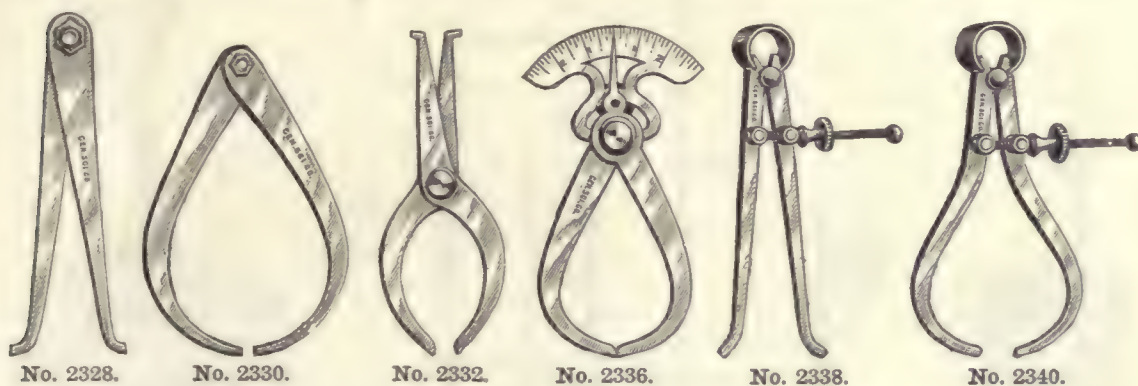
BURNER ACCESSORIES

2226.	BURNER BLOWPIPE ATTACHMENT , to fit on a $\frac{7}{16}$ inch burner tube. Takes the place of both blowpipe and blowpipe tip, leaving both hands free. Should be used with rubber tube and glass mouthpiece.....	\$0.90
2228.	BURNER BLOW PIPE TIP , with rest, for blowpipe, fitting outside $\frac{7}{16}$ inch burners.....	.16
2230.	BURNER BLOW PIPE TUBE , for yellow flame, fitting inside $\frac{7}{16}$ inch burners.....	.18
2232.	BURNER CHIMNEY , of Russia iron, to protect flame from drafts, for use with No. 2246 Star Support. Diameter at bottom, 2 inches; at top, $1\frac{1}{2}$ inches; height, 2 inches.....	.15
2234.	BURNER CHIMNEYS , of Russia iron, with attached support.	
	No.	A B
	For burner tube, diameter, inches.....	$\frac{7}{16}$ $\frac{1}{2}$
	Each .....	.80 .85
2236.	BURNER CROWN TOP , giving round flame, for heating dishes; diameter, 1 inch.....	.50
2238.	BURNER FORK for attaching burner to ring stand.....	.30
2240.	BURNER GAUZE TOP , giving large round flame; diameter, $1\frac{1}{2}$ inches.....	.26
2242.	BURNER GUARD , of vitrified earthenware for protecting a flame from drafts. Will also be found a rigid and convenient support, measuring 9 inches high, 8 inches diameter at base, 5 inches diameter at top. Provided with hole for rubber tubing and inlets for air to support combustion .....	.50
2246.	BURNER STAR for supporting No. 2232 Chimney .....	.26
2248.	BURNER SUPPORTS , of iron, with heavy screw for clamping on supports or tripods.	
	No.	A B
	Diameter, inches.....	$3\frac{1}{2}$ 5
	Each .....	.25 .60
2250.	BURNER TRIPODS for holding dishes, measuring $2\frac{1}{2}$ inches between supporting points.	
	No.	A B
	For burner tube, diameter, inches.....	$\frac{7}{16}$ $\frac{1}{2}$
	Each .....	.16 .18
	BURNER TUBING , see Rubber Tubing.	
2252.	BURNER WING TOPS for use in bending glass tubing.	
	No.	A B
	For burner tube, diameter, inches.....	$\frac{7}{16}$ $\frac{1}{2}$
	Each .....	.09 .18



CALCIUM CHLORIDE TUBES

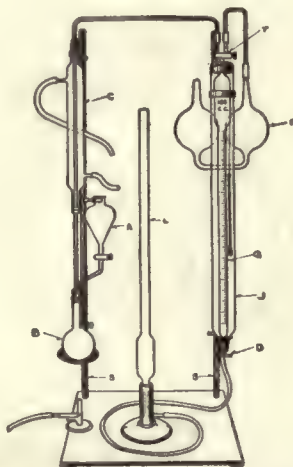
2300.	CALCIUM CHLORIDE JARS, Drying Towers, on foot, with tubulature near bottom.				
	Height, inches	8	10	12	
	Each	\$1.80	2.50	3.20	
2302.	CALCIUM CHLORIDE JARS, similar to No. 2300, but with perforated ground glass stopper and side tube near top.				
	Height, inches.....		10	12	
	Each		4.50	4.80	
2304.	CALCIUM CHLORIDE TUBES, one bulb, straight delivery tube.				
	Length to bottom of bulb, inches.....	4	6	8	10
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$
	Each .....	.11	.13	.16	.22
2306.	CALCIUM CHLORIDE TUBES, two bulbs, straight delivery tube.				
	Length to bottom of first bulb, inches.....	4	6	8	10
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$
	Each .....	.13	.15	.18	.24
2308.	CALCIUM CHLORIDE TUBES, with small inner tube to collect moisture in first bulb.				
	Length to bottom of first bulb, inches.....	4	6	8	10
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{7}{8}$
	Each .....	.25	.30	.36	.40
2310.	CALCIUM CHLORIDE TUBES, U shape, plain.				
	Length, inches	4	6	8	10
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
	Each .....	.12	.20	.25	.40
2312.	CALCIUM CHLORIDE TUBES, U shape, with side tubes.				
	Length, inches	4	6	8	
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	
	Each .....	.20	.25	.35	
2314.	CALCIUM CHLORIDE TUBES, U shape, with side tubes and bulb on one.				
	Length, inches	4	6	8	
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	
	Each .....	.25	.35	.50	
2316.	CALCIUM CHLORIDE TUBES, Marchand's, with cork and connecting tube.				
	Length, inches	4	6		
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	
	Each .....	.30	.30	.35	
2318.	CALCIUM CHLORIDE TUBES, Peligot's, U shaped with three bulbs.				
	Length, inches	4	6	8	
	Diameter of tube, inches.....	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	
	Each .....	.30	.40	.70	
2320.	CALCIUM CHLORIDE TUBES, Schwartz, with side tubes and perforated ground in glass stoppers.				
	No.		A	B	
	Length, inches		4	6	
	Diameter of tube, inches.....		$\frac{5}{8}$	$\frac{5}{8}$	
	Each		1.40	1.75	
CALIBRATING BURETTES, see Burettes.					
CALIBRATING PIPETTES, see Pipettes.					



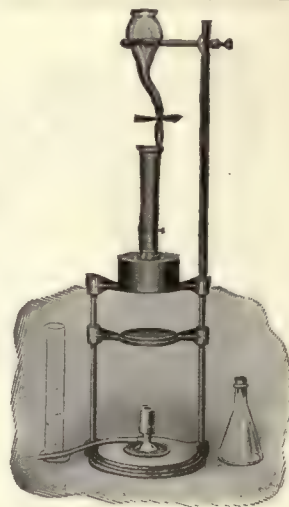
- | | | |
|-------|--|--------|
| 2328. | CALIPER, Inside. Polished steel. Length, 15 cm..... | \$0.35 |
| 2330. | CALIPER, Outside. Polished steel. Length 15 cm..... | .35 |
| 2332. | CALIPER, Double. Inside and outside. Polished steel. Length, 15 cm..... | .40 |
| 2336. | CALIPER, Registering, Double. Inside and outside. Nickel-plated. Total length, 15 cm. | 1.35 |
| 2338. | CALIPER, Spring, Inside. Even tension, solid nut. Polished steel. Length, 12.5 cm..... | 1.00 |
| 2340. | CALIPER, Spring, Outside. Even tension, solid nut. Polished steel. Length, 12.5 cm.... | 1.00 |
| 2342. | CALIPER, Micrometer, Metric. This caliper will measure all sizes up to 25 mm, and is graduated to read to 0.01 mm. It is provided with a friction head so that all measurements are made with the same degree of pressure..... | 6.50 |
| 2344. | CALIPER, Micrometer, Metric, for measurements up to 25 mm, graduated to read to 0.01 mm. Provided with a ratchet stop, same as No. 2348 | 7.50 |
| 2346. | CALIPER, Micrometer, Metric, for measurements up to 25 mm, graduated to read to 0.01 mm. Similar to No. 2344, but with neither friction head nor ratchet stop..... | 6.50 |
| 2348. | CALIPER, Micrometer, English, for measurements up to 1 inch, graduated to read to 0.001 in. Provided with ratchet stop..... | 7.50 |
| 2350. | CALIPER, Micrometer, English, for measurements up to 1 inch, graduated to read to 0.001 in. Similar to No. 2342, but with neither friction head nor ratchet stop..... | 6.50 |
| 2352. | CASE for Micrometer Caliper, covered with morocco leather and lined with velvet. Will hold either No. 2344, No. 2346, No. 2348 or No. 2350 | .75 |
| 2354. | CALIPER, Vernier, of steel; length, over 16 cm; the most complete vernier caliper on the market. Inside caliper, outside caliper and depth gauge combined. Graduated to 5 inches in 16th inch divisions and to 12 centimeters in millimeter divisions; reading by verniers to 1/128 inch and 1/10 millimeter. Thumb attachment for easy operation. Neat, accurate and durable | 4.00 |
| 2356. | CALIPER, Vernier, of steel, same as No. 2354 with the addition of a micrometer screw adjustment. | 6.00 |
| 2357. | CASE for Vernier Caliper, leather. Will hold either No. 2354 or No. 2356. | .70 |



No. 2360.



No. 2376.



No. 2378.

CALORIMETERS

2360. **CALORIMETER**, Parr Standard, for determining the heat units in coal, coke, lignite and oils. The most rapid and convenient apparatus for measuring the calorific power of fuels. Requires no special skill in manipulation and no complicated connections to oxygen tanks, etc. Outfit is readily portable, being self-contained. Requires power to operate stirrer, which can be furnished by water motor or electric motor. Determinations can be quickly made, requiring not more than 20 minutes to complete a test on a prepared sample. The bomb or combustion cup furnished is made of a special alloy which resists the action of the melted sodium peroxide, and can be used continuously. An arrangement is made whereby the water is not admitted to contact with the bomb until the fusion is completed, thus insuring the complete combustion of the sample. A further advantage of this calorimeter is the fact that sulphur and total carbon may be easily determined from the fused product of the combustion by the Sulphur Photometer (see No. 2378), and the Total Carbon Apparatus (see No. 2376). Two interchangeable fusion cups are furnished enabling duplicate determinations to be made. Complete with thermometer reading from 65° to 90°F. in $\frac{1}{20}^{\circ}$ divisions with Bureau of Standards certificate, reading lens with support, two-liter measuring flask, chemical receptacle, measuring cup, 100-mesh 5 inch brass sieve with bottom, forceps, camel hair brush, ignition wire, chemicals sufficient for fifty determinations and battery for ignition, but without motor..... \$85.00
- Accessories and Parts for Parr Standard Calorimeter.**
2361. **ELECTRIC MOTOR**, variable speed, for 110 volts A. C. or D. C. mounted on support..... 23.00
2362. **ELECTRIC MOTOR**, variable speed, for 220 volts A. C. or D. C. mounted on support..... 23.00
2363. **WATER MOTOR and Support**..... 5.00
- 13533A. **THERMOMETER**, 65° to 90° F., in $\frac{1}{20}^{\circ}$ divisions, with Bureau of Standards certificate... 12.00
- 13533B. **THERMOMETER**, 65° to 105° F., in $\frac{1}{20}^{\circ}$ divisions, with Bureau of Standards certificate... 15.00
2366. **ADJUSTABLE RHEOSTATS**, for use with lighting circuit in place of battery to reduce voltage to safe limit for ignition.
- | No. | A | B |
|-----------------------------|------|------|
| For volts | 110 | 220 |
| Total resistance, ohms..... | 50 | 90 |
| Each | 7.50 | 8.50 |
2367. **IGNITION WIRE** for electric ignition..... per card .75
2368. **BOMB** for Electric Ignition, complete with wrenches 35.00
13730. **READING LENS**, with support..... 3.00
13731. **READING LENS** only, without support..... 2.00
2371. **SODIUM PEROXIDE**, a special quality put up for use with the Parr Calorimeter, in metal container.
- | Size, pounds | $\frac{1}{4}$ | $\frac{1}{2}$ | 1 |
|--------------------|---------------|---------------|------|
| Each | 1.10 | 1.95 | 3.00 |
2372. **ACCELERATOR**..... per 2 ounce bottle 1.00
2373. **GASKETS** for bomb..... per dozen .40
2376. **TOTAL CARBON APPARATUS**, Parr, for total carbon in coal, coke, etc., in connection with the Parr Standard Calorimeter. By adding acid to the dissolved residue from the combustion, which appears as sodium carbonate, carbon dioxide is liberated and measured under proper conditions. Complete with full directions for use 52.00
2378. **SULPHUR PHOTOMETER**, Parr, for use in connection with the Parr Standard Calorimeter, for readily indicating the percentage of sulphur in coal, coke, and petroleum. The fused mass obtained from the calorimeter bomb is dissolved in water and the sulphur precipitated by means of barium chloride. From the depth of the liquid in the graduated tube at which the light from the flame disappears, a reading is obtained directly which indicates the percentage of sulphur in the sample..... 40.00
2379. **BARIUM OXALATE** for use with No. 2378..... per 2 ounce bottle .75

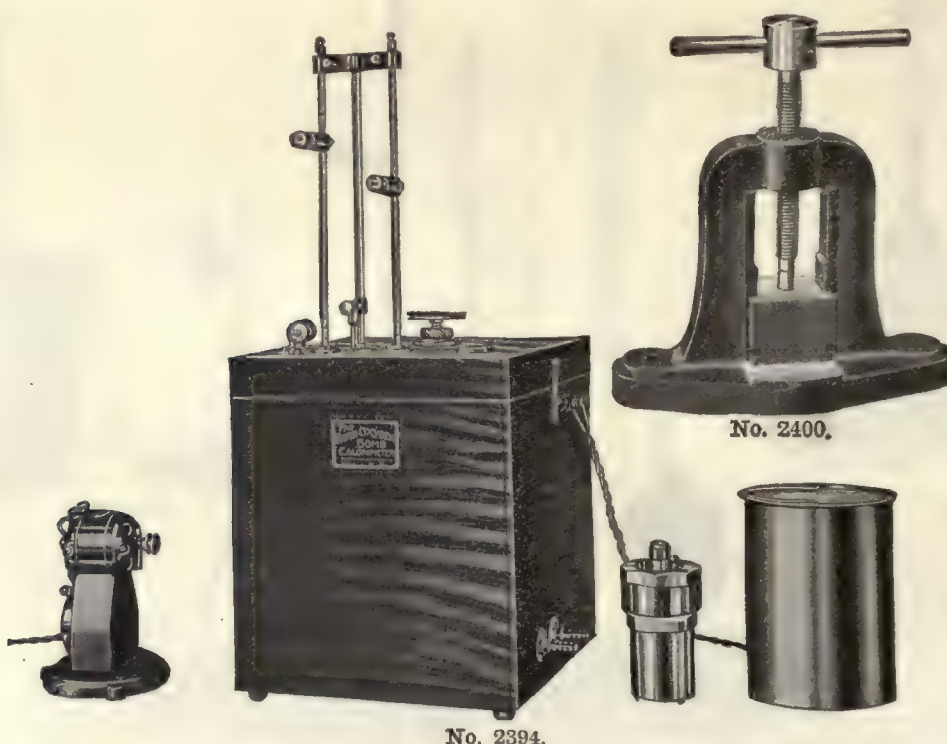


No. 2382.

2382. **CALORIMETER, Parr Oxygen Bomb**, a new instrument of the Berthelot-Mahler type with a bomb made of the new acid-resisting alloy Illium. This metal has proved by means of tests extending over several years to be equivalent to or better than platinum for calorimetric work. This feature renders unnecessary any costly lining of gold or platinum, and consequently makes the Parr outfit the most economical of the bomb calorimeters recognized as standard. The new bomb is also entirely free from the corrosion to which the platinum-lined steel bombs are subject, and eliminates the annoyance due to the chipping and cracking of the enamel in porcelain-lined bombs. A rubber gasket is substituted for the lead of the old type, and a check valve with rubber seat replaces the needle valve. The calorimeter can is oval in shape permitting the use of a rotary stirrer which quickly distributes the heat and obviates any temperature lag. Complete with Illium bomb, water container, insulating vessel of indurated fibre with cover of same, rotary stirrer, pressure gage and needle valve with oxygen connection and couplings, octagon socket for bomb, spanner wrench, six capsules of special alloy, reading lens and support, special ignition wire and gaskets, but without thermometer or motor. (See Report of the Joint Committee of the American Chemical Society and American Society for Testing Materials, in the Journal of Industrial and Engineering Chemistry, Vol. IX, No. 1, for January 1917) \$285.00

Accessories and Parts for Parr Oxygen Bomb Calorimeter.

2361. ELECTRIC MOTOR , variable speed, for 110 volts A. C. or D. C.	23.00
2362. ELECTRIC MOTOR , variable speed, for 220 volts A. C. or D. C.	23.00
13533A. THERMOMETER , 65° to 90° F., in $\frac{1}{20}^{\circ}$ divisions, with Bureau of Standards certificate...	12.00
13533B. THERMOMETER , 65° to 105° F., in $\frac{1}{20}^{\circ}$ divisions, with Bureau of Standards certificate...	15.00
13519. THERMOMETER, Beckmann Differential , with range of 5 to 6 degrees graduated to $\frac{1}{100}^{\circ}$ C., with Bureau of Standards certificate.....	32.50
2384. BOMB only of Illium alloy.....	210.00
2385. WATER CONTAINER	10.00
2386. INSULATING VESSEL , of fiber, with cover, stirrer and pulley.....	30.00
2387. PRESSURE GAGE , with needle valve, oxygen connections and couplings.....	6.50
2388. OCTAGON SOCKET for bomb.....	3.50
2389. SPANNER WRENCH	6.50
13730. READING LENS , with support.....	3 00
13731. READING LENS only, without support.....	2 00
2367. IGNITION WIRE	per card .75
2390. GASKETS for Valve.....	per dozen .90
2391. GASKETS for Union.....	per dozen .25
2392. CAPSULES , of Illium alloy.....	each 3.50



No. 2394.

2394. **CALORIMETER, Parr Adiabatic Oxygen Bomb.** An entirely new adiabatic system is employed which insures a degree of accuracy not possible with pneumatic or vacuum methods. Water is kept circulating constantly throughout the cover and on all sides of the jacket, the temperature of which is under the positive control of the operator. By turning the proper valve, either cooler or warmer water is instantly admitted and immediately distributed throughout the jacket permitting the operator to keep the temperature controlled in either direction to correspond absolutely with that in the calorimeter proper. This is a feature not found in any other commercial calorimeter. By this means errors due to radiation or to conductivity lag are eliminated and the use of calculations made unnecessary. The cover is pivoted so that it swings out of the way in a horizontal plane, carrying the thermometer with it, thus reducing the danger of breakage to a minimum. The water container and bomb are the same as those employed in the Oxygen Bomb Calorimeter No. 2382. Complete with water container, Illum bomb, adiabatic water jacket, rotary stirrers, pressure gage and needle valve with oxygen connection and couplings, octagon socket for bomb, spanner wrench, six capsules of special alloy, reading lens and support, special ignition wire and gaskets, but without thermometer, motor, heater, or heater burner..... \$375.00

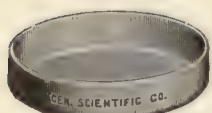
Parts and Accessories for Parr Adiabatic Oxygen Bomb Calorimeter.

- | | | |
|-------|--|-------|
| 2395. | HEATER for water supply system..... | 25.00 |
| 2397. | HEATER BURNER | 1.00 |
| 2398. | ELECTRIC MOTOR , variable speed, for 110 volts A. C. or D. C..... | 28.00 |
| 2399. | ELECTRIC MOTOR , variable speed, for 220 volts A. C. or D. C..... | 28.00 |
- For other parts, see those listed under **Parr Oxygen Bomb Calorimeter No. 2382.**
Note:—If desired by those who are accustomed to using only platinum lined bombs, we shall be glad to quote prices on a special platinum lined Illum bomb. The advantages of this over the usual platinum lined steel bomb are obvious.
- | | | |
|-------|---|-------|
| 2400. | PELLET PRESS and Mold , complete, for preparing fuel pellets for calorimetric determinations | 20.00 |
|-------|---|-------|

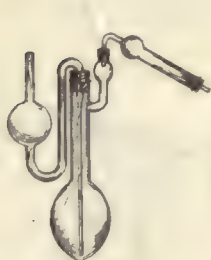
OXYGEN CYLINDERS for use with Oxygen Bomb Calorimeter, see **Gas, Oxygen.**

CALORIMETERS, Gas, see **Gas Analysis Apparatus.**

CANS, Sample, see **Boxes.**



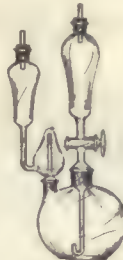
No. 2408.



No. 2412.



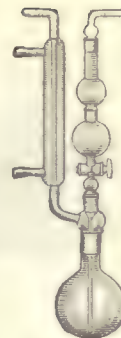
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No. 2416.



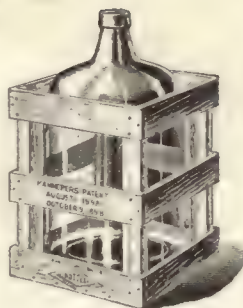
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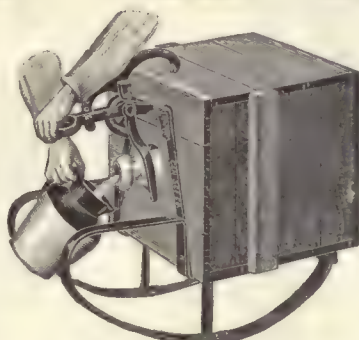
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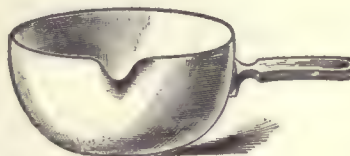
No. 2410.



No. 2422.



No. 2426 (shown in use).



No. 2428.

2408. CAPSULES, Best American Porcelain, as used in milk analysis, ash determination in flour, etc. With straight sides and flat bottom, glazed throughout.	No.....	1	3	4
Capacity, cc.....		13	25	45
Diameter, mm.....		45	69	72
Height, mm.....		12	13	16
Each		\$0.25	.35	.40

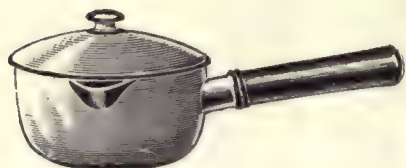
CAPSULES, Combustion, see Combustion Capsules.

CARBON BATHS, see Water Baths.

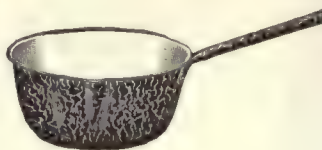
CARBON DISSOLVING TUBES, see Test Tubes.

CARBON DIOXIDE DETERMINATION APPARATUS

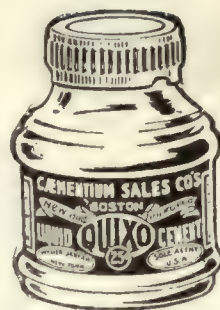
2410. CARBON DIOXIDE APPARATUS, Barker, for the determination of carbonates in limestone, fertilizers, soda baking powders, etc. The outfit consists chiefly of a special hydrometer, in the bulb of which is a reservoir for acid and a reaction chamber for the carbonate. No balances are required, as the change in weight is read directly in percentage of carbon dioxide on the graduated stem. It is suitable for any carbonate containing more than 5 per cent. carbon dioxide, and permits an accuracy as great as in the standard laboratory method. A certificate of accuracy is furnished with each outfit. Complete with special hydrometer, jar, thermometer, graduated cylinder, dropping pipette, and one pound of hydrochloric acid in glass stoppered bottle		12.00
2411. HYDROMETER only of No. 2410.....		9.00
2412. CARBON DIOXIDE APPARATUS (Alkalimeter), Bunsen's		1.20
2413. CARBON DIOXIDE APPARATUS (Alkalimeter), Geissler's new form, with ground joint..		1.20
2414. CARBON DIOXIDE APPARATUS (Alkalimeter), Knorr's, for determination of carbonic acid in carbonates, especially baking powder, recommended by the Association of Official Agricultural Chemists. All joints are ground together.....		11.40
2415. CARBON DIOXIDE APPARATUS, same as No. 2414, but with rubber connections instead of ground joints		9.00
2416. CARBON DIOXIDE APPARATUS (Alkalimeter), Mohr's, with two ground joints.....		3.30
2418. CARBON DIOXIDE APPARATUS (Alkalimeter), Schroedter's, with tube in flask.....		3.80
CARBON FILTER TUBES, see Filter Funnel.		
2422. CARBOY, Glass, in rubber cushioned crate, capacity 5 gallons.....		3.50
2424. CARBOY, Glass, boxed, capacity 10 gallons.....		10.00
2426. CARBOY INCLINATOR, Flaherty's. A lever locks the carboy to the inclinator, and on account of the shape of the rockers the carboy always returns to an upright position when released. A very convenient method of tilting a heavy carboy		8.50
2427. CARDBOARD, Bristol Board, best quality for drawing, in sheets 11x14 inches. Each .....		.05
	Per dozen	.35
2428. CASSEROLES, Best American Porcelain, with lip and porcelain handle, glazed with exception of rim. No.....	1 2 3 3A 4 4A 5 6 7	
Capacity, cc.....	30 75 150 210 375 500 750 1250 2000	
Outside diameter, mm.....	50 70 85 95 110 120 135 165 175	
Each .....	.35 .40 .50 .70 .90 1.15 1.40 2.00 3.50	



No. 2430.



No. 2432.



No. 2448.

2430. CASSEROLES, Porcelain, lipped, with porcelain cover and wooden handle.

Capacity, cc.....	125	250	375	500	750	1000
Diameter, mm.....	90	105	110	120	152	172
Each	\$0.50	.60	.75	1.00	1.50	1.70

2432. CASSEROLES, Agateware, with handle.

Manufacturer's rated capacity, ounces.....	16	32	64
Each .....	.25	.30	.36

2434. CASSEROLES, Opaque Fused Silica, with handle and lip.

No.	A	B	C	D	E
Capacity, cc.....	30	75	150	200	350
Diameter, mm.....	51	70	82	95	108
Depth, mm.....	25	35	44	51	63
Each	2.20	2.70	3.30	4.25	5.50

CATHETOMETERS, see CATALOG F OF PHYSICAL APPARATUS.**2436. CEMENT, ALUNDUM REFRACTORY, for use in repairing muffles, cores, electric furnaces, and in general wherever a refractory cement of high thermal conductivity is desirable. Used extensively for covering resistance wire in electric furnaces. When mixed with water to make a thick paste it is ready for use. Furnished in three mixtures, RA 162 for general work, RA 355 where a fine grained cement is required, and RA 305, for use where a cement with a vitrifying point of 500°C. is needed. Unless specified when ordering, mixture RA 162 will be furnished.**

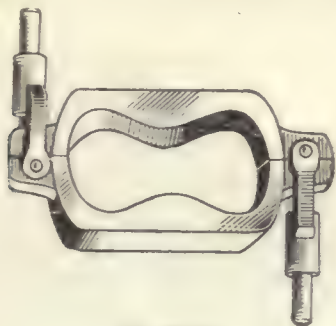
In lots of, pounds.....	1	5	10
Mixture RA 162.....	.40	.75	1.30
Mixture RA 355.....	.50	1.25	2.50
Mixture RA 305.....	.50	1.25	2.50

CEMENT, Asbestos, see Asbestos Cement, No. 308.

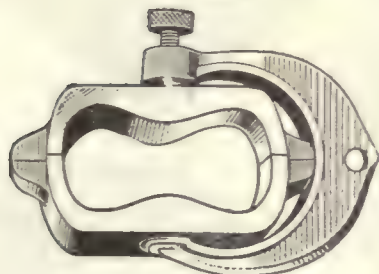
CEMENT, De Khotinsky Laboratory. This well-known cement is not attacked by water, sulphuric, nitric or hydrochloric acids, bisulphide of carbon, benzine, gasoline or turpentine, and is very little affected by ether, chloroform, caustic alkalies, etc. Comes in small sticks of about 1 oz., large sticks of about 2 oz. and in bulk by the pound. Prepared in three different grades as follows: **Hard** for cementing glass, metal and porcelain; **medium** for cementing and insulating purposes; **soft** for insulating and covering electric wires, for condensers, static machines, protection against corrosion and for cementing rubber, hard rubber, wood, ivory, etc.

No.	A	B	C
Size	Small Stick.	Large Stick.	Pound.
2440. CEMENT, De Khotinsky Laboratory, Hard.....	.55	1.10	6.60
2441. CEMENT, De Khotinsky Laboratory, Medium.....	.55	1.10	6.60
2442. CEMENT, De Khotinsky Laboratory, Soft.....	.55	1.10	6.60
2443. CEMENT, De Khotinsky Black, Medium. For imitating Niello or producing decorations on metals by filling in engraved lines, letters, and figures. This cement does not shrink or sink below the surface of the metal with time, and after polishing gives the luster and appearance of black enamel. In sticks of about ½ ounce	Per stick .30		
2444. CEMENT, De Khotinsky Black, Soft, similar to No. 2443, but with a lower melting point. In sticks of about ½ oz.....	Per stick .30		
2446. CEMENT, Loxol, for joining or mending china, glass, metal, wood, and for electrical insulation. In 8 oz. cans.....	Per can .50		
2448. CEMENT, Quixo or Liquid Porcelain. When dry it is not affected by fire or water. It will cement all articles except India rubber, vulcanite, celluloid and black-lead. Excellent for building aquaria, making labels, etc. In 6-ounce cans	Per can .25		

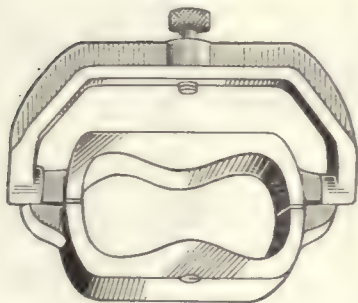
CEMENT, Rubber, see Rubber Cement.



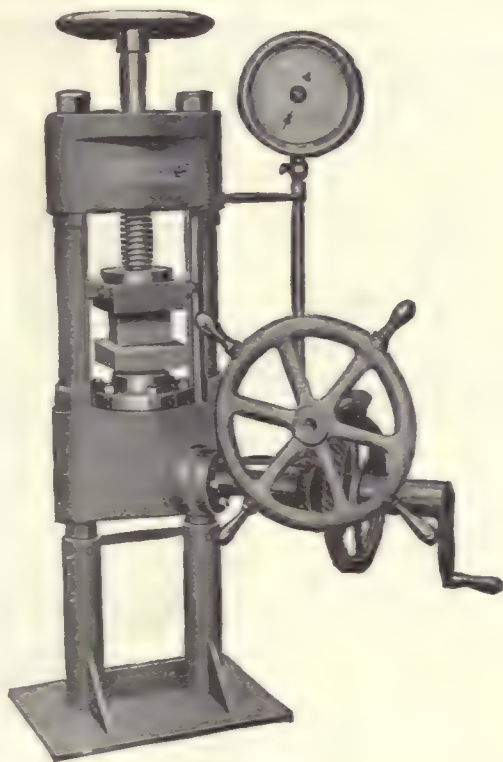
No. 2454



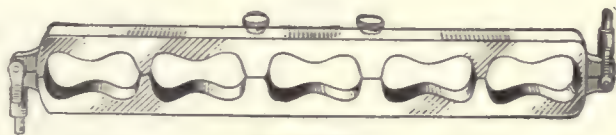
No. 2456.



No. 2460.



No. 2466.



No. 2462D.

CEMENT TESTING APPARATUS

AUTOCLAVES for Cement, see general heading Autoclaves.
BALANCES for Cement, see general heading Balances.

- 2454. **BRIQUETTE MOLD**, American Society for Testing Materials Type, of brass with end clamps \$3.50
- 2456. **BRIQUETTE MOLD**, American Society for Testing Materials Type, of brass with iron horseshoe clamp 3.50
- 2457. **IRON HORSESHOE CLAMP** only for No. 2456..... .40
- 2460. **BRIQUETTE MOLD**, Improved Form, American Society for Testing Materials Type, for separating sections without rapping..... \$3.50
- 2462. **BRIQUETTE GANG MOLDS**, American Society for Testing Materials Type, of brass with end and center clamps.

No.	A	B	C	D	E
Number of briquettes.....	2	3	4	5	6
Each	7.00	10.00	13.50	16.50	20.00

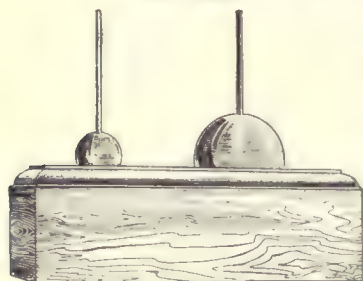
- 2464. **BRUSH**, of brass wire in wood handle for cleaning briquette molds. Length of brush portion, 5 inches75

- 2466. **COMPRESSION TESTING MACHINE**, Olsen's Hydraulic Hand Power, designed to meet the demand for a low priced compression machine for cement and concrete. The pressure is obtained by forcing a cylindrical ram into the oil cylinder of the machine by means of a hand wheel and worm gear. A spherical bearing is employed in mounting the table which enables it to adjust itself to the faces of the specimen in order to transmit the pressure uniformly. The load on the specimen at all times is shown by a hydraulic gage connected to the oil cylinder. The platens are scribed with concentric circles to facilitate centering the specimen and are large enough to hold a 6 inch cube, with an extreme distance of 6½ inches between faces. Size of machine: 30 inches long, 30 inches wide and 72 inches high. Weight, 1000 pounds. Capacity, 40,000 pounds F. O. B. Philadelphia 350.00

Note:—This machine is furnished to order only and we cannot promise immediate delivery.



No. 2482.



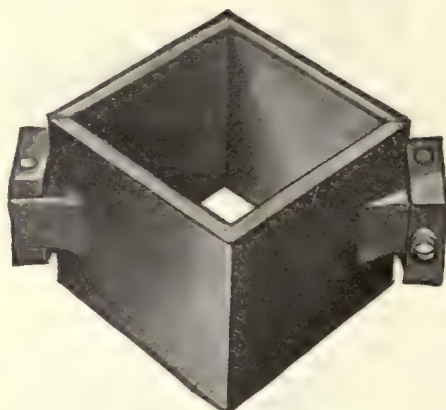
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No. 2472.



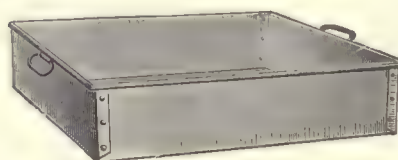
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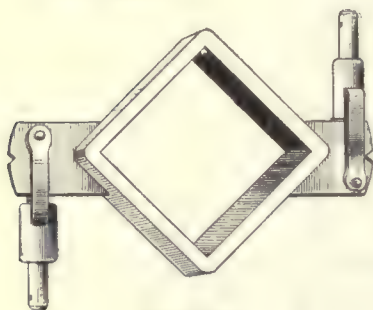
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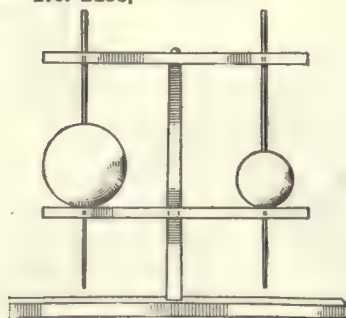
No. 2486.



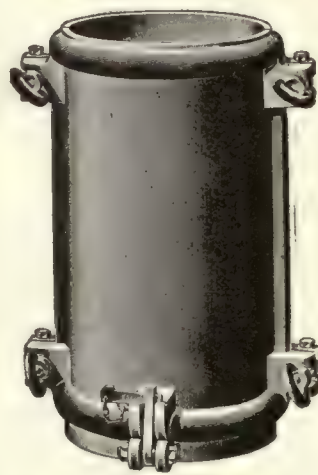
No. 2488.



No. 2478.



No. 2470.

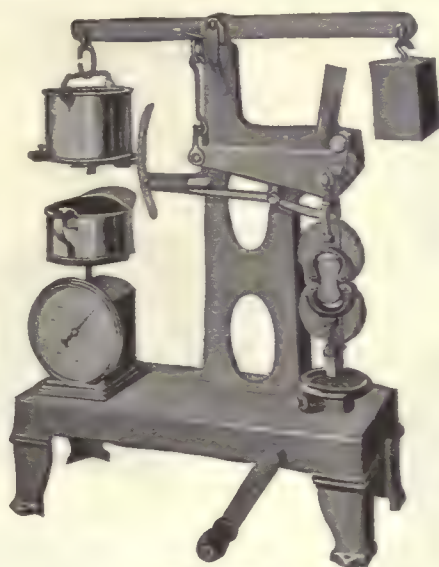


No. 2476.

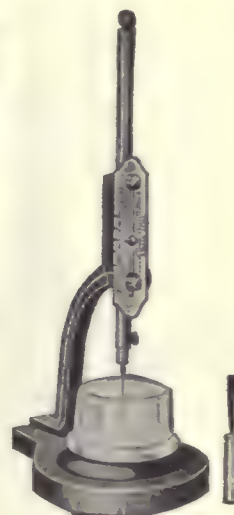
2468. **GILLMORE NEEDLES** in block, for determining both the initial and the final set of cement. They consist of a pair of steel needles, one, $\frac{1}{4}$ inch in diameter loaded with a weight of $\frac{1}{4}$ pound, and the other $\frac{1}{4}$ inch in diameter loaded with a weight of one pound. \$6.00
2470. **GILLMORE NEEDLES**, same as No. 2468, but with vertical support to keep the needles perpendicular to the surface of the pat. 6.00
- MOIST CHAMBER for Cement**, of soapstone, furnished to order. **Prices on application.**
2472. **MOLDS**, Cylindrical, brass, for preparing cylinders used in determining the compressive strength of Portland cement mortars. Diameter, 2 inches; height, 4 inches. (See Tentative Standard of the American Society for Testing Materials C 9—16 T) 8.00
2473. **TAMPER**, Steel, for use with No. 2472. Weight, about $\frac{3}{4}$ pound; length, $6\frac{1}{2}$ inches; diameter at top, $\frac{5}{8}$ inch; at bottom, 1 inch. 3.50
2476. **MOLD**, Cylindrical, cast iron, with detachable base plate and hinged clamps, machined to size. Diameter, 8 inches; depth, 16 inches. 27.50
2478. **MOLDS**, Cube, of brass, with hinge clamp for preparing cubes for compression tests.
- | | | |
|----------------------------|------|------|
| No. | A | B |
| For cubes, inches. | 1 | 2 |
| Each | 3.50 | 4.50 |
2480. **MOLD**, Cube, of iron, hinged, for 6 inch cubes, with detachable base plate. 9.00
2482. **MOLDS**, Cube, of brass, same as No. 2478, but in gangs of 2 molds.
- | | | |
|----------------------------|------|------|
| No. | A | B |
| For cubes, inches. | 1 | 2 |
| Each | 3.00 | 4.00 |
2486. **MOLD**, Pat, for forming pats of neat cement intended for steaming tests. 2.50
2488. **PAN**, of galvanized iron, for immersing briquettes in water before testing. Size, 24x24x3 inches 1.50
2490. **PLATE**, of heavy glass, for use in mixing cement and filling briquette molds. Size, 24x24 inches 4.50
- SAMPLE CANS for Cement**, see Boxes No. 1828.
2496. **SAND**, Standard, for cement testing, according to the American Society for Testing Materials per 100 pound bag 4.00



No. 2502.



No. 2508.



No. 2514.



No. 2500.



No. 2504.



No. 2512.



No. 2498.

2498. **SOUNDNESS TEST APPARATUS**, Le Chatelier, for indicating the soundness of cement by its expansion after being boiled..... \$3.50
2500. **SPECIFIC GRAVITY APPARATUS**, Jackson's, for the accurate determination of the specific gravity of cement. Consists of a special burette calibrated to give specific gravity readings directly, and a special flask with ground in funnel. (See Journal of the Society of Chemical Industry, Vol. XXIII, No. 11, for June 15, 1904) 7.00
- SPECIFIC GRAVITY BOTTLES** for Cement, see **Bottles, Specific Gravity**.
2502. **STEAMING APPARATUS**, of polished copper, tinned on inside, for boiling and steaming cement specimens for determining soundness. Size, 15x15x30 inches. Mounted on sheet iron support, with shelf of wire screen and gas burner..... 37.50
- 1614G. **CONSTANT LEVEL BOTTLE** for use with No. 2502. Capacity, 2 gallons..... 3.00
2504. **TAMPER** for uniformly packing cement in briquette molds 12.00
2506. **TESTING MACHINE**, Olsen New Automatic, for tension tests, the latest type of automatic shot cement tester. The shot is used to counterbalance the heavy weight, and when it is removed the tension produced is applied to the briquette. The shot is caught in a container on a balance which indicates on a special graduated dial the force applied up to the time of rupture, when the flow of shot is automatically shut off. The action and weighing of shot is absolutely automatic, requiring no reweighing to determine the load applied. Size: 24 inches long, 10 inches wide, and 30 inches high. Weight, 150 pounds; capacity, 1000 pounds.
..... F. O. B. Philadelphia 200.00
- Note:**—This machine is furnished to order only and we cannot promise immediate delivery.
2508. **TESTING MACHINE**, Olsen Improved Automatic, for tension tests. Same as No. 2506, but provided with a crank in the base for applying a steady tension to the briquette in order to hold the beam in equilibrium throughout the test. Size: 40 inches long, 11 inches wide and 36 inches high. Weight, 170 pounds; capacity, 2000 pounds. F. O. B. Philadelphia 350.00
- Note:**—This machine is furnished to order only and we cannot promise immediate delivery.
2509. **LEAD SHOT** for use with Nos. 2506 and 2508.....per 25 pound bag 5.00
2512. **TROWELS** for mixing cement.
Length of blade, inches..... 3 4
Each50 .60
2514. **VICAT NEEDLE APPARATUS**, Bramwell Improved Form, for determining the normal consistency and setting time of cement according to the methods recommended by the American Society for Testing Materials. The needles are on opposite ends of the 300 gram plunger rod, the change being made by reversing the rod. Diameter of large needle, 1 cm; diameter of small removable needle, 1 mm..... 20.00
2515. **RUBBER MOLD** only for No. 2514..... 3.00



No. 2524.



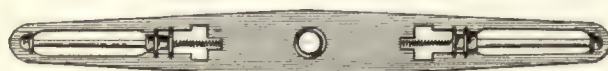
No. 2534.



No. 2536.



No. 2541.



No. 2542.

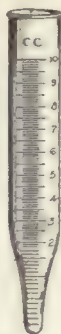
CENTRIFUGES

CENTRIFUGES, HAND AND WATER MOTOR

2524. **CENTRIFUGE, Hand Driven**, high speed, giving from 1,000 to 3,000 revolutions per minute, for the rapid and accurate analysis of urine, sputum, blood, pus, milk and the precipitation of solids in any liquid. The case is of iron, well finished, the bearings accurate, the gear wheels cut by special machinery, and the pitch so calculated as to render the machine almost noiseless. Complete with two aluminum shields, one each 15 cc plain and graduated glass tubes. \$11.00
2526. **CENTRIFUGE, Hand Driven**, same as No. 2524, but with arm for holding four tubes. Complete with four aluminum shields, two each 15 cc plain and graduated tubes. This machine is capable of doing the work of two ordinary centrifuges 17.25
2528. **CENTRIFUGE, Hand Driven**, same as No. 2524, with two tubes for the examination of urine and with haematocrit for the examination of blood and sputum. 18.00
2530. **CENTRIFUGE, Hand Driven**, same as No. 2526, with four tubes for the examination of urine and with haematocrit for the examination of blood and sputum. 22.50
2532. **CENTRIFUGE, Water Motor**, for attachment to ordinary smooth faucet. Speed is controlled by flow of water. So constructed that bearings cannot become rusted nor can oil be washed out. Noiseless in operation. Each machine is furnished with aluminum shields, 3 feet pressure tubing, and hose connection for attachment to smooth faucet. Complete with 2-tube 15 cc head, two aluminum shields, and one each 15 cc plain and graduated glass tubes. 12.00
2534. **CENTRIFUGE, Water Motor**, same as No. 2532, but with four-tube 15 cc head, four aluminum shields, and two each 15 cc plain and graduated glass tubes. 18.80
2536. **CENTRIFUGE, Water Motor**, same as No. 2532, but with two-tube 50 cc head for the examination of kerosene or liquids where larger quantities are to be tested. Complete with aluminum shields, and two 50 cc graduated glass tubes 21.00
- Accessories for Hand and Water Motor Centrifuges.**
2537. **TWO-TUBE HEAD** for 15 cc tubes, without shields or glass tubes. 4.35
2538. **FOUR-TUBE HEAD** for 15 cc tubes, without shields or glass tubes. 6.85
2539. **TWO-TUBE HEAD** for 50 cc tubes, without shields or glass tubes. 7.80
2540. **FOUR-TUBE HEAD** for 50 cc tubes, without shields or glass tubes. 13.80
2541. **TWO-TUBE HEAD, Goetz**, for phosphorus determinations in steel, with metal shields, but without glass ware 12.60
2542. **HAEMATOKRIT**, with two tubes each for examination of blood and sputum. 7.25
2543. **PERCENTAGE TUBE for Blood Analysis**, for No. 2542.90
2544. **SPUTUM TUBE** for No. 2542.36
2545. **DROPPER**, new construction, for filling the blood tubes.25
2546. **GRADUATED URINE TUBES**, 15 cc. each .65
per dozen 6.50



No. 2570.



No. 2548.



No. 2551.



No. 2553.



No. 2555.



No. 2556.

2547.	PLAIN URINE TUBES, 15 cc.....	each	\$0.20
		per dozen	2.00
2548.	GRADUATED TUBE, length $4\frac{1}{4}$ inches, outside diameter $1\frac{1}{16}$ inch, graduated to 10 cc...		.40
2549.	PLAIN TUBE, same as No. 2548, but ungraduated, length of tube $4\frac{1}{4}$ inches, outside diameter $1\frac{1}{16}$ inch .....		.20
2550.	ALUMINUM SHIELD for 15 cc tubes.....		.30
2551.	GOETZ TUBE for phosphorus determinations, with graduated tip.....		1.10
2552.	METAL SHIELD for carrying No. 2551 Goetz Tube		1.10
2553.	CEMENT TUBE, with 50 cc graduation, with tip graduated to $\frac{1}{50}$ cc, for cement testing and for use where the proportion of sediment is extremely small		1.50
2554.	METAL SHIELD, for carrying No. 2553 Cement Tube		1.10
2555.	TUBE FOR MILK ANALYSIS, graduated for obtaining a reliable test of either breast or cow's milk. It will give results accurate to within $\frac{1}{5}$ of 1 per cent. of fat.....		.65
2556.	CONICAL TUBE, graduated to 50 cc, for use in testing kerosene and other liquids where larger quantities are to be tested than can be carried in a 15 cc tube.....		1.00
2557.	CONICAL TUBE, plain, same as No. 2556 without graduations.....		.50
2558.	ALUMINUM SHIELD for carrying Nos. 2556 and 2557.....		.85
2559.	SPEED INDICATOR		3.00
	CENTRIFUGES for Oil, see Oil Testing Apparatus.		

CENTRIFUGES, ELECTRIC

CENTRIFUGES, VICTOR

After a careful investigation we have selected the Victor line of electric centrifuges because of their superiority in the following important respects:—

1. The electric motor, which is the heart of any centrifuge, is carefully made, obviating any electrical troubles, such as burn-outs, overheating, loose contacts, etc.
2. The shaft is accurately centered, preventing vibration.
3. The motor is so wound that by shifting a single contact in the base, it can be changed from an A. C. to a D. C. motor. **It is not a universal motor.**
4. The centrifuge head is carefully balanced and weighted so as to produce a smooth uniform motion, without any jerk in starting or stopping.
5. The relation between speed, weight, and centrifugal force has been worked out with mathematical exactness so that one can instantly determine what centrifuge to procure in order that a given force may be exerted on the suspended particles.
6. The construction and finish of these centrifuges are such as to afford the greatest protection from chemical reagents.
7. A complete line of accessory parts, including glassware, is available.

2570. **CENTRIFUGE, Victor No. 3**, with motor entirely enclosed in enameled iron jacket. Can be operated on either 110 volt A. C. or D. C. by shifting a single connection in the base. Complete with two-tube head of heavy construction, with attached trunnion rings, two conical aluminum shields for 15 cc tubes, and attachment cord and plug, **without glassware.**

Specifications:—

Height over all, 12 inches.
Width over all, rotating, 15 inches.
Weight, 23 pounds.
Average spread, 26 cm.

R. P. M. (A. C.) 1500.
Relative force (times gravity) 325.
R. P. M. (D. C.) 1800.
Relative force (times gravity) 469.

Price \$32 00

2572. **CENTRIFUGE, Victor No. 3**, same as No. 2570, but arranged for 220 volts A. C. and D. C. 35.00



No. 2580 with No. 2588.

2574. **CENTRIFUGE, Victor No. 3**, same as No. 2570, but equipped with four-tube head and four aluminum shields for 15 cc tubes, **without glassware**.

Specifications same as No. 2570, except:—

R. P. M. (A. C.) 1350.

Relative force 264.

R. P. M. (D. C.) 1400.

Relative force 286.

Price \$34.50

2576. **CENTRIFUGE, Victor No. 3**, same as No. 2574, but arranged for 220 volts A. C. and D. C. 37.50

2578. **RHEOSTATS** for controlling speed of No. 3 Centrifuges.

No.	A	B
For volts	110	220
Each	3.60	3.60

For other **ACCESSORIES**, see list at end of section on **Victor Centrifuges**.

2580. **CENTRIFUGE, Victor No. 2**, similar to No. 2570, but of heavier construction, can be operated at a higher speed, will handle larger volumes of liquid, and has a rheostat in the base by means of which three different speeds may be obtained. The motor, arranged for both 110 volts A. C. and D. C., is entirely enclosed in an iron jacket, enameled with black acid-proof finish. Complete with two-tube head with attached trunnion rings, two conical aluminum shields for 15 cc tubes, and attachment cord and plug, **without glassware**.

Specifications:—

Height over all, 15 inches.

Diameter over all, 10 inches.

Weight, 22½ pounds.

Average spread, 18 cm.

R. P. M. (A. C.) with Protective Dome No. 2588, 2800.
Relative force, 780.

R. P. M. (D. C.) with Protective Dome No. 2588, 3300.
Relative force, 1050.

Price 43.70

2582. **CENTRIFUGE, Victor No. 2**, same as No. 2580, but arranged for 220 volts A. C. and D. C. 46.70

2584. **CENTRIFUGE, Victor No. 2**, same as No. 2580, but with four-tube head with attached trunnion rings, four conical aluminum shields, and attachment cord and plug, **without glassware**.

Specifications:—

Height over all, 15 inches.

Diameter over all, 10 inches.

Weight, 22½ pounds.

Average spread, 18 cm.

R. P. M. (A. C.) with Protective Dome No. 2588, 2500.
Relative force 620.

R. P. M. (D. C.) with Protective Dome No. 2588, 3000.
Relative force 900.

Price 47.50

2586. **CENTRIFUGE, Victor No. 2**, same as No. 2584, but arranged for 220 volts A. C. and D. C. 50.50

2588. **PROTECTIVE DOME**, of heavy spun copper, polished, with closely fitting lid with handle. Can be easily attached to any Victor No. 2 Centrifuge. The use of this dome permits a higher speed, and eliminates danger to the operator. 10.50

Accessories for No. 2 Centrifuges.

2589. **TWO-TUBE HEAD**, with attached trunnion rings and 50 cc round bottomed bronze shields, with rubber cushions 9.70

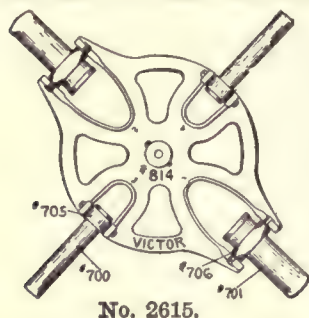
2590. **TWO-TUBE HEAD**, with Babcock trunnion cups and rubber cushions, for determining the percentage of butter-fat in milk or cream. 11.40

For other **ACCESSORIES**, see list at end of section on **Victor Centrifuges**.

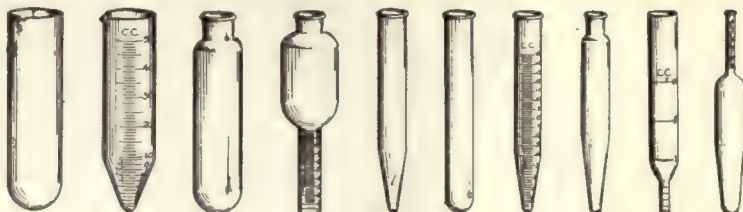


Nos. 2594-2608.

2594. **CENTRIFUGE, Victor No. 4**, for heavy work and wide range of speed. The motor, arranged for both 110 volts A. C. and D. C., is entirely shut off from the centrifuge chamber, eliminating any danger of ignition of combustible vapors from sparking. The protective dome is cast as an integral part of the motor housing, and is provided with a heavy hinged lid. A rheostat in the base permits five different ranges of speed. A variety of multiple tube heads may be used and greater speed can be obtained than with the No. 2 or No. 3. Complete with four-tube head with attached trunnion rings, four 15 cc round bottomed bronze shields with rubber cushions, and attachment cord and plug, **without glassware**.
- Specifications:—
Height over all with cover closed, 18½ inches.
Height over all with cover open, 29½ inches.
Width over all, 18½ inches.
Weight, 100 pounds.
Average spread, 28 cm.
- R. P. M. (A. C.), 2300.
Relative force (times gravity), 830.
R. P. M. (D. C.), 2700.
Relative force (times gravity), 1140.
- Price \$105.70
2596. **CENTRIFUGE, Victor No. 4**, same as No. 2594, but arranged for 220 volts A. C and D. C. 109.20
2598. **CENTRIFUGE, Victor No. 4**, same as No. 2594, but with eight-tube head with attached trunnion rings and eight 15 cc round bottomed bronze tubes with rubber cushions.
- Specifications same as No. 2594, except:—
R. P. M. (A. C.), 2300.
Relative force (times gravity), 830.
- R. P. M. (D. C.), 2600.
Relative force (times gravity), 1060.
- Price 113.15
2600. **CENTRIFUGE, Victor No. 4**, same as No. 2598, but arranged for 220 volts A. C. and D. C. 116.65
2602. **CENTRIFUGE, Victor No. 5**, similar in construction to No. 2594, but with specially powerful motor, designed to take care of all work from the lightest to the very heaviest. The motor, arranged for both 110 volt A. C. and D. C., is enclosed in the same frame as the No. 4, but is capable of a much wider range of speed. Complete with five point rheostat for regulating speed, large oil wells easily accessible, four-tube 15 cc head with attached trunnion rings, four 15 cc round bottomed bronze tubes, and attachment cord and plug.
- Specifications:—
Height over all with cover closed, 18½ inches.
Height over all with cover opened, 29½ inches.
Diameter over all, 18½ inches.
Weight, 105 pounds.
Average spread, 28 cm.
- R. P. M. (A. C.), 3700.
Relative force (times gravity), 2140.
R. P. M. (D. C.), 4000.
Relative force (times gravity), 2460.
- Price 118.20
2604. **CENTRIFUGE**, same as No. 2602, but arranged for both 220 volts A. C. and D. C. 121.20
2606. **CENTRIFUGE**, same as No. 2602, but with eight-tube 15 cc head with attached trunnion rings, and eight 15 cc round bottom bronze tubes with rubber cushions.
- Specifications same as No. 2602, except:—
R. P. M. (A. C.), 3400.
Relative force, 1810.
- R. P. M. (D. C.), 3600.
Relative force, 2000.
- Price 125.65
2608. **CENTRIFUGE**, same as No. 2606, but arranged for both 220 volts A. C. and D. C. ... 128.65



No. 2615.



No. 2632. No. 2633. No. 2634. No. 2635. No. 2649. No. 2650. No. 2651. No. 2652. No. 2653. No. 2656.

Accessories for Nos. 4 and 5 Victor Centrifuges.

2611.	FOUR-TUBE HEAD , with attached trunnion rings and four 15 cc round bottomed bronze tubes with rubber cushions.....	\$10.20
2612.	FOUR-TUBE HEAD , with attached trunnion rings and four 50 cc round bottomed bronze tubes with rubber cushions.....	15.10
2613.	EIGHT-TUBE HEAD , with attached trunnion rings and eight 15 cc round bottomed bronze tubes with rubber cushions.....	17.65
2614.	EIGHT-TUBE HEAD , with attached trunnion rings and eight 50 cc round bottomed bronze tubes with rubber cushions.....	26.45
2615.	FOUR-TUBE COMBINATION HEAD , with trunnion rings, two 15 cc and two 50 cc round bottomed bronze tubes with rubber cushions.....	12.65
2616.	EIGHT-TUBE COMBINATION HEAD , with trunnion rings, four 15 cc and four 50 cc round bottomed bronze tubes with rubber cushions.....	23.05
2619.	TRUNNION RINGS for Heads Nos. 2611 to 2616.	
	No.	A B
	For tubes, cc.....	15 50
	Each .....	.35 .90

Accessories Which Can Be Used With Victor Centrifuges Nos. 2, 4, and 5.

2627.	BRONZE SHIELD , round bottom, for 50 cc glass tubes for use with No. 2619B Trunnion Ring, including Rubber Cushion No. 2628.....	.75
2628.	RUBBER CUSHIONS for No. 2627 Shield.....	each .18
		per dozen 1.80
2629.	BABCOCK TRUNNION CUP for use with Heads Nos. 2589, 2612 and 2614, including No. 2630 Cushion	1.50
2630.	RUBBER CUSHIONS for No. 2629 Cup.....	each .15
		per dozen 1.45
2631.	BUSHING for reducing size of No. 2627 Shield to take 15 cc tubes.....	.60
2632.	GLASS TUBES , 50 cc, plain, with lip.....	each .15
		per dozen 1.50
2633.	GLASS TUBES , 50 cc, graduated.....	each .80
		per dozen 8.00
2634.	GLASS TUBES , 50 cc, plain, narrow neck.....	each .20
		per dozen 2.00
2635.	HART CASEIN GLASS TUBES , 50 cc.....	each .50
		per dozen 5.00

BABCOCK MILK TEST BOTTLES, see Milk Testing Apparatus.

Accessories Which Can Be Used With Any Victor Centrifuge.

2646.	ALUMINUM SHIELD for 15 cc glass tubes, with conical bottom.....	.35
2647.	BRONZE SHIELD for 15 cc glass tubes, with round bottom and rubber cushion.....	.55
2648.	RUBBER CUSHIONS for No. 2647 Shields.....	each .15
		per dozen 1.50
2649.	GLASS TUBES , 15 cc, plain, with conical bottom.....	each .15
		per dozen 1.50
2650.	GLASS TUBES , 15 cc, plain, round bottom.....	each .10
		per dozen 1.10
2651.	GLASS TUBES , 15 cc, graduated, with conical bottoms.....	each .55
		per dozen 5.50
2652.	GLASS TUBES , 15 cc, plain with narrow neck.....	each .20
		per dozen 2.00
2653.	HOPKINS VACCINE TUBES , 10 cc.....	each 2.20
		per dozen 22.00
2656.	BABCOCK TEST TUBES for human milk.....	each .90
		per dozen 9.90
2657.	RUBBER CAPS for Tubes Nos. 2649, 2650, and 2651.....	each .20
		per dozen 2.20
2658.	SPEED INDICATOR	3.30
2659.	PEDESTAL , specially designed for Victor Centrifuges. Dimensions: height, 19 inches; spread over all, 24 inches; diameter of top, 14 1/4 inches	26.00



Nos. 2670-6.

CENTRIFUGES, INTERNATIONAL

INTERNATIONAL CENTRIFUGES are so well known as to need no comment. The ones listed below are those which have proved most adapted to laboratory needs and will cover practically every requirement of the scientific worker. They are carried in stock for prompt shipment. Prices upon any others not listed will be furnished upon request, and deliveries can be made within a reasonable length of time.

The centrifuges are mounted in a heavy bell shaped casting which furnishes at the same time a rigid base, a protective housing and a strong bearing for the motor. Ample provision is made for oiling. The lower end of the shaft of the motor runs on a ball step immersed in oil. A speed control rheostat is supplied with each centrifuge.

The prices of the centrifuges whose description follows, do not include heads or equipment. Select the ones adapted to your needs from the list of accessories. We carry in stock parts for which there is the greatest demand. Other types or parts will be obtained upon short notice.

2670. **CENTRIFUGE, International No. 1, Type B**, for 110 volts alternating current. With rheostat for speed control, but without heads or tubes.

Specifications:—

Height, cover closed, 23 inches.
Height, cover open, 33 inches.
Diameter, 17 inches.
Shipping weight, about 270 pounds.
Speed with four-tube 15 cc head and tubes,
3600 r. p. m.
Relative force times gravity, 2015.
Average spread, 28 cm.

Speed with eight-tube 50 cc head and tubes,
3000 r. p. m.
Relative force, 1600.
Average spread, 32 cm.
Speed with Board of Health Head, 3000
r. p. m.
Relative force, 900.
Average spread, 18 cm.

Price \$117.60

2672. **CENTRIFUGE, International No. 1, Type B**, same as No. 2670, but for 220 volts alternating current 117.60

2674. **CENTRIFUGE, International No. 1, Type B**, for 110 volts direct current. With rheostat for speed control but without heads or tubes.

Specifications:—

Height, cover closed, 18 inches.
Height, cover open, 28 inches.
Diameter, 17 inches.
Shipping weight, about 160 pounds.
Speed with four-tube 15 cc head and tubes,
4000 r. p. m.
Relative force times gravity, 2491.
Average spread, 28 cm.

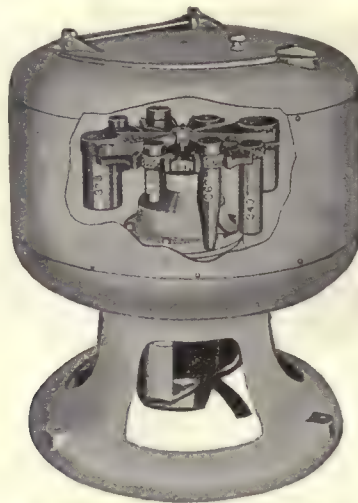
Speed with eight-tube 50 cc head and tubes,
3000 r. p. m.
Relative force times gravity, 1600.
Average spread, 32 cm.
Speed with Board of Health Head, 3000
r. p. m.
Relative force, 900. •
Average spread, 18 cm.

Price 102.00

2676. **CENTRIFUGE, International No 1, Type B**, same as No. 2674, but for 220 volts direct current 105.60

Accessories for International Centrifuge No. 1, Type B.

- | | |
|--|-------|
| 2677. Two-Tube 15 cc Head and attached trunnion rings | 3.60 |
| 2678. Four-Tube 15 cc Head and attached trunnion rings | 8.40 |
| 2679. Eight-Tube 15 cc Head and attached trunnion rings | 14.40 |
| 2680. Two-Tube 50 cc Head only without trunnion rings | 4.20 |
| 2681. Four-Tube 50 cc Head only without trunnion rings | 8.40 |
| 2682. Four-Tube Combination Head, with two attached 15 cc trunnion rings only and places for two
50 cc trunnion rings..... | 8.40 |
| 2683. Eight-Tube Combination Head, with four attached 15 cc trunnion rings only and places for four
50 cc trunnion rings..... | 15.60 |



No. 2696.

2684.	Two-Place Head only for Goetz tubes or separatory funnels	\$4.20
2685.	Eight-Tube 50 cc Head only.....	14.40
2686.	Board of Health Disk, without tubes.....	14.40
2687.	Bronze Basket, 5 inches in diameter, perforated, with copper drip can.....	26.40
2688.	Cast Iron Stand for mounting No. 1 Centrifuge	13.20
2689.	Two-Bottle Shaker Head for use on No. 1 Centrifuge	24.00
2696.	CENTRIFUGE, International No. 2, similar in construction to No. 2670, but larger, affording greater capacity and rendering available more varied equipment. The same equipment of heads and tubes may be used and in addition 100 cc tubes swung in the eight-tube head; also a sixteen-tube head carrying 50 cc tubes or Babcock test bottles. In addition a two-place or a four-place head for Squibb's separatory funnels of about 150 cc capacity may be used. Other combinations will be found in the list of accessories which follows. Equipped with hand brake for bringing quickly to rest, and device for lifting brushes permitting a very gradual decrease in speed in coming to rest. Complete with rheostat for speed control but without head or tubes, with motor for 220 volts alternating current.	

Specifications:—

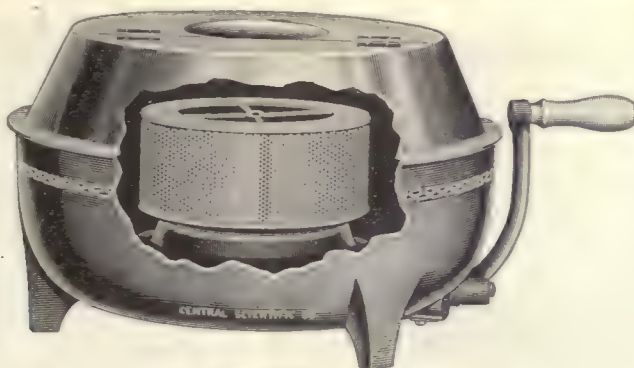
Height, cover closed, 28 inches.
 Height, cover open, 40 inches.
 Diameter, 24 inches.
 Shipping weight, about 450 pounds.
 Speed with 16-tube 50 cc head and tubes,
 2000 r. p. m.
 Relative force, 954.
 Average spread, 43 cm.
 Speed with 8-tube 100 cc head and tubes,
 2200 r. p. m.
 Relative force, 1077.
 Average spread, 40 cm.

Speed with 8-tube 50 cc head and tubes,
 3100 r. p. m.
 Relative force, 1708.
 Average spread, 32 cm.
 Speed with Board of Health Head, 3000
 r. p. m.
 Relative force, 900.
 Average spread, 18 cm.
 Speed with 4-tube 250 cc head and tubes,
 2400 r. p. m.
 Relative force, 1152.
 Average spread, 36 cm.

	Price	186.00
2698.	CENTRIFUGE, International No. 2, same as No. 2696, but for 220 volts alternating current.	186.00
2700.	CENTRIFUGE, International No. 2, same as No. 2696, but for 110 volts direct current....	186.00
2702.	CENTRIFUGE, International No. 2, same as No. 2700, but for 220 volts direct current....	186.00

Accessories for International Centrifuge No. 2, in Addition to those Listed under Centrifuge No. 1.

2704.	Two-Place Head only for Goetz tubes or separatory funnels	7.20
2705.	Four-Place Head only for Goetz tubes or separatory funnels	11.50
2706.	Eight-Tube Combination Head only for 6 small tubes and 2 Goetz tubes or funnels.....	18.00
2708.	Sixteen-Tube Head only, for 15, 50 or 100 cc tubes, or Babcock test bottles.....	22.80
2709.	Bronze Basket, 11 inches in diameter, perforated, with copper drip-can.....	42.00
2710.	Metal Shield for 100 cc tubes, Cornell style, with rubber cushion.....	.90
2711.	Trunnion Ring for 100 cc tubes.....	.48
2712.	Long Metal Cup for 9 inch Babcock bottles in head No. 2708 only, with rubber cushion....	.90
2713.	Special Long Metal Cup for 9 inch Babcock bottles in Heads Nos. 2681, 2685, and 2706, with rubber cushion	1.32
2714.	Metal Shield for 100 cc Oil Tube No. 2717, with rubber cushion.....	1.50
2715.	Trunnion Ring for Metal Tubes Nos. 2712, 2713, and 2714.....	.48
2716.	Glass Tubes, 100 cc, plain, lipped.....	each .25
		per dozen 2.30
2717.	Glass Oil Tubes, 100 cc, graduated.....	each 3.00
		per dozen 30.00



No. 2770.

2718.	Rubber Cushions for 100 cc Shield, Cornell style.....	each	\$0.30
		per dozen	2.88
2719.	Rubber Cushions for 100 cc Oil Tubes No. 2717.....	each	.55
2720.	Cast Iron Stand for mounting No. 2 Centrifuge.....		14.40
2721.	Four-Bottle Shaker Head for use on No. 2 Centrifuge.....		28.80
	Accessories for Both No. 1 and No. 2 International Centrifuges.		
2728.	Metal Shield for 15 cc glass tubes, Cornell style, with rubber cushion.....		.65
2729.	Reducing Cap for use with 15 cc glass tubes in 50 cc metal shields.....		.18
2730.	Metal Shield for 50 cc glass tubes, Cornell style, with rubber cushion.....		.80
2731.	Trunnion Ring for 15 cc tubes.....		.55
2732.	Trunnion Ring for 50 cc tubes.....		.48
2733.	Babcock Test Trunnion Cup, with rubber pad, for use in place of 50 cc tubes.....		.72
2735.	Square Trunnion Cup for Sputum Bottle No. 2757 for use in place of 50 cc tubes.....		.94
2736.	Trunnion Carrier for 150 cc Squibb separatory funnels, for use with Heads Nos. 2704 and.....		2705
			2.40
2737.	Trunnion Carrier for Goetz phosphorus tubes for use with Heads Nos. 2704 and 2705....		2.20
2738.	Glass Tubes, 15 cc, plain.....	each	.20
		per dozen	1.92
2739.	Glass Tubes, 15 cc, graduated in $\frac{1}{10}$ divisions.....	each	.60
		per dozen	5.76
2740.	Glass Tubes, 15 cc, round bottom, plain.....	each	.12
		per dozen	1.20
2741.	Glass Tubes, 15 cc, narrow neck.....	each	.25
		per dozen	2.35
2742.	Hopkins Vaccine Tubes, 10 cc, for use in Metal Shield No. 2728.....	each	1.45
2743.	Babcock Test Tubes for human milk, for use in Metal Shield No. 2728.....	each	.55
		per dozen	5.50
2744.	Glass Tubes, 50 cc, plain, lipped.....	each	.25
		per dozen	2.20
2745.	Glass Tubes, 50 cc, plain, narrow neck.....	each	.20
		per dozen	2.20
2746.	Glass Tubes, 50 cc, graduated in $\frac{1}{2}$ cc divisions to 10 cc; in 1 cc divisions to 50 cc.....	each	.90
		per dozen	9.00
2747.	Hart Casein Tubes for use in Metal Shields No. 2730.....	each	.60
		per dozen	5.76
2748.	Squibb Glass Separatory Funnel, 150 cc, for use in Trunnion Carrier No. 2736.....		2.85
2749.	Goetz Glass Phosphorus Tube, with stopper, for use in Trunnion Carrier No. 2737.....		2.30
2750.	Board of Health Glass Tubes, 2 cc.....	per hundred	5.70
2751.	Rubber Stoppers for Board of Health Tubes.....	per hundred	2.20
2752.	Board of Health Tubes, set of 20, with 40 stoppers.....	per set	2.40
2753.	Rubber Cushions for 15 cc shields, Cornell style.....	per dozen	1.08
2754.	Rubber Cushions for 50 cc shields, Cornell style.....	per dozen	2.20
2755.	Rubber Caps for Tubes Nos. 2738, 2739 and 2740.....	per dozen	1.08
2756.	Molded Soft Rubber Caps for Glass Tubes No. 2745.....	per dozen	1.15
2757.	Square Sputum Bottles, with corks.....	per dozen	.73
		per gross	6.80
2758.	Speed Revolution Counter.....		1.80
2770.	CENTRIFUGAL MACHINE, Hand, for chemical use, consisting of Milk Testing Centrifuge No. 9204C, fitted with a heavily tinned perforated copper basket $7\frac{3}{8}$ inches in diameter and $3\frac{3}{4}$ inches deep, with $\frac{1}{2}$ inch flange at the top. Can be used for a variety of purposes, such as drying crystals, etc. Where corrosive materials are used, the inside of the iron case should be coated with some resistant material, such as paraffine or acid-proof varnish. The case is provided with an outlet at the bottom for draining.....		
	CENTRIFUGES, Babcock or Milk Testing, see Milk Testing Apparatus.		
	CENTRIFUGE, International Board of Health, see Milk Testing Apparatus.		
	CENTRIFUGES, Soil, see Soil Analysis Apparatus.		
	CENTRIFUGES, Moisture Equivalent, see Soil Analysis Apparatus.		



No. 2772.



No. 2782.

2772. **CENTRIFUGAL MACHINES**, of acid proof construction, with basket and drip-can of porcelain. Especially adapted for determining yield of sugar in refinery laboratories, and for drying crystals in the experimental manufacture of chemical salts. The centrifuge is housed in a cast iron frame with enclosed direct connected motor with special bearings. The cast iron draining chamber has an outlet at the bottom and the base is cut away to allow a collecting jar to be placed beneath the outlet. Complete with rheostat for speed control, perforated porcelain basket 6 inches in diameter, porcelain drip-can and interchangeable four-tube head with set of 10 cc plain glass tubes. Dimensions: height over all with cover closed, 22 inches; with cover open, 34½ inches; diameter of cast iron chamber outside, 11 inches; maximum speed permissible with porcelain basket, 2500 r. p. m.; speed with four-tube head, 3000 r. p. m.; shipping weight, 160 pounds.

No.	A	B	C	D
	A. C.		D. C.	
For volts	110	220	110	220
Each	\$128.70	128.70	128.70	128.70

Note:—If larger centrifuges are desired than the preceding, information will be furnished and prices quoted upon receipt of specifications giving purpose for which used, size of basket or number of tubes speed desired, character of driving power, etc.

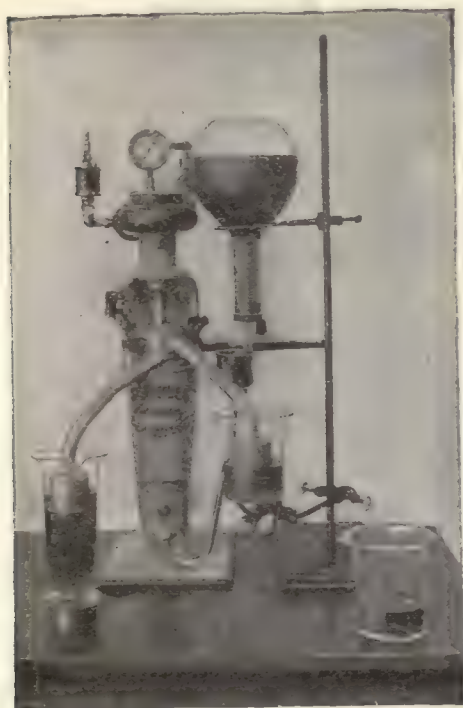
Accessories for Centrifugal Machine No. 2772.

- | | | |
|-------|--|---------------|
| 2774. | Perforated Porcelain Basket, 6 inches in diameter | 23.10 |
| 2775. | Porcelain Draining Chamber for use with No. 2774 | 19.80 |
| 2776. | Perforated Bronze Basket, 8 inches in diameter | 113.30 |
| 2777. | Four-Tube Head, with metal shields for 10 cc tubes, with rubber cushions..... | 13.20 |
| 2778. | Four-Tube Combination Head, with 2 metal shields for 10 cc tubes and 2 trunnion cups for Gooch crucibles | 14.85 |
| 2779. | Hard Rubber Collars for Gooch crucibles..... | per pair 2.75 |

Note:—Gooch Crucibles must be sent in to be fitted to No. 2779, as they vary in size.

2782. **CENTRIFUGAL MACHINE**, Sharples Super-Centrifuge, gear driven, for hand power or belt drive. Designed for the application of extreme speed and centrifugal force to laboratory problems. Operating speed of 25,000 revolutions per minute produces a separating force over 15,000 times as great as gravity. In addition to maximum speed and separating force it has the further advantage of handling liquids continuously.

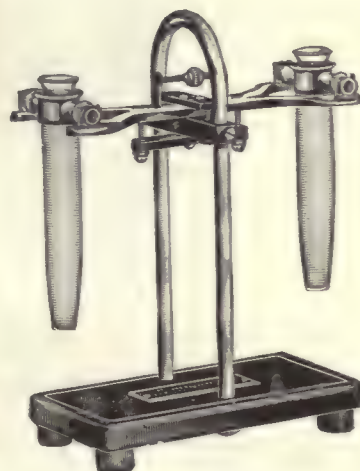
By means of this centrifuge colloidal particles may be separated from liquids; bacteria and impurities may be removed from hot agar solutions; calcium soaps from wool fat, and oil soap and fatty acids from gelatine; water from fusel oil; suspended matter from lacquers, acids, glue, etc.; sulphuric acid from oil; pigments from paints and varnishes, and many other determinations and separations made which otherwise can be effected not at all or with great difficulty. Especially valuable in the chemical laboratory for slow filtering precipitates such as ferric hydrate, ammonium phosphomolybdate, arsenic sulphide, etc., in routine analysis.



No. 2784.



No. 2785.



No. 2790.

CENTRIFUGAL MACHINE, Sharples Super-Centrifuge, Continued.

The machine consists essentially of an iron frame cast in one piece. Within this is suspended a seamless tubular tin lined steel bowl, by means of a flexible spindle, with a cone at its upper end, running on ball bearings. By means of the cone bearings wear is automatically taken up. At the lower end of the bowl is a guide or drag which keeps the bowl centered and absorbs vibrations. Parts are easily removed for cleaning and can be readily and economically replaced when worn.

The liquid comes in contact only with tinned surfaces except in passing through the feed nozzle, which is of nickel; consequently weak acids or alkalies may be handled continuously or stronger reagents for brief periods. If desired the machine parts may be obtained plated with gold, silver, or platinum, at an additional charge.

Height of machine, 24 inches.

Weight, 50 pounds.

Diameter of inner bowl, 2 inches.

Capacity of bowl, 250 cc.

Complete with tin lined bowl, geared crank and pulley, 2x10 inches, for hand or belt drive \$125.00

Size of base, 10½x8 inches.

Maximum speed of gear driven machine, 25,000 r. p. m.

Power required to operate, ¼ h. p.

2784. **CENTRIFUGAL MACHINE, Sharples**, same as No. 2782, but with turbine wheel attached to shaft for driving with steam or compressed air at 20 pounds pressure. With a pressure of 25 pounds, a maximum speed of 40,000 r. p. m. is attained, producing a centrifugal force of over 40,000 times gravity. Air consumption, 40 cubic feet per minute; steam consumption, 60 pounds of water per hour. Complete with speed indicator..... 125.00
2785. **Extra Inner Bowl**, of steel nickel-plated, for use in clarifying or filtering liquids in quantities not exceeding 50 cc. It is not continuous in action. Consists of two parts, threaded to screw together. Liquid is placed in lower part, the top screwed on, the whole bowl is then placed within the regular super-centrifuge bowl. When the bowl revolves, the liquid is instantly drawn into the upper chamber, where the solids are packed against the outer-wall. The liquid again collects in the lower part when the machine is stopped, leaving a perfectly clear filtrate. Quantitative results may be secured with proper care. Especially valuable in handling serums and bouillons in bacteriological work..... 8.00
2786. **Extra Inner Bowl**, same as No. 2785, but silver-plated 12.00
2787. **Extra Inner Bowl**, same as No. 2785, but gold-plated 15.00
2788. **Extra Inner Bowl**, same as No. 2785, but platinum-plated..... Price quoted upon application.
2790. **CENTRIFUGE TUBE BALANCE**, for use in selecting glass centrifuge tubes whose weights are approximately equal, in order to prevent centrifuge bearings from wearing unevenly. It will take either 15 cc or 50 cc standard tubes. Finished in black enamel and nickel-plate. Complete with two aluminum shields and two 15 cc plain glass tubes, mounted on enameled iron base with rubber feet 18.00

A TABLE OF THE CHEMICAL ELEMENTS WITH THEIR ATOMIC WEIGHTS

COMPILED BY DR. F. W. CLARKE
AND REPORTED TO THE AMERICAN CHEMICAL SOCIETY

NAME	SYMBOL	ATOMIC WEIGHT	NAME	SYMBOL	ATOMIC WEIGHT	NAME	SYMBOL	ATOMIC WEIGHT
Aluminum	Al	27.1	Helium	He	4.0	Rhodium	Rh	102.9
Antimony (Stibium)	Sb	120.2	Hydrogen	H	1.008	Rubidium	Rb	85.45
Argon	A	39.9	Iodine	I	126.92	Ruthenium	Ru	101.7
Arsenic	As	75.0	Iridium	Ir	193.1	Samarium	Sm	150.4
Barium	Ba	137.37	Iron (Ferrum)	Fe	55.85	Scandium	Sc	44.1
Bismuth	Bi	208.0	Krypton	Kr	81.8	Selenium	Se	79.2
Boron	B	11.8	Lanthanum	La	139.0	Silicon	Si	28.3
Bromine	Br	79.92	Lead (Plumbum)	Pb	207.10	Silver (Argentum)	Ag	107.88
Cadmium	Cd	112.40	Lithium	Li	7.00	Sodium (Natrium)	Na	23.00
Cæsium	Cs	132.81	Lutetium	Lu	174.0	Strontium	Sr	87.62
Calcium	Ca	40.09	Magnesium	Mg	24.32	Sulphur	S	32.07
Carbon	C	12.00	Manganese	Mn	54.93	Tantalum	Ta	181.0
Cerium	Ce	140.25	Mercury (Hydrargyrum)	Hg	200.0	Tellurium	Te	127.5
Chlorine	Cl	35.46	Molybdenum	Mo	96.0	Terbium	Tb	159.2
Chromium	Cr	52.1	Neodymium	Nd	144.3	Thallium	Tl	204.0
Cobalt	Co	58.97	Neon	Ne	20.0	Thorium	Th	232.42
Columbium (Niobium)	Cb	93.5	Nickel	Ni	58.68	Thulium	Tm	168.5
Copper (Cuprum)	Cu	63.57	Nitrogen	N	14.01	Tin (Stannum)	Sn	119.0
Dysprosium	Dy	162.5	Osmium	Os	190.9	Titanium	Ti	48.1
Erbium	Er	167.4	Oxygen	O	16.00	Tungsten (Wolframium)	W	184.0
Europium	Eu	152.0	Palladium	Pd	106.7	Uranium	U	238.5
Fluorine	F	19.0	Phosphorus	P	31.0	Vanadium	V	51.2
Gadolinium	Gd	157.3	Platinum	Pt	195.0	Xenon	Xe	128.0
Gallium	Ga	69.9	Potassium (Kalium)	K	39.10	Ytterbium (Nebutyrium)	Yb	172.0
Germanium	Ge	72.5	Praseodymium	Pr	140.6	Yttrium	Y	89.0
Glucium (Beryllium)	Gl	9.1	Radium	Ra	226.4	Zinc	Zn	65.37
Gold (Aureum)	Au	197.2				Zirconium	Zr	90.6

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CENTRAL SCIENTIFIC CO.
CHICAGO, U. S. A.

CORRECTED TO 1918.

REPRODUCED BY PERMISSION OF
LABORATORY APPARATUS
AND SUPPLIES

No. 2804.

2800. **CHAMOIS SKIN**, for cleaning instruments, etc.

No.	A	B	C	D
Size, inches	6x8	9x11	10x13	14x18
Each	\$0.15	.30	.45	1.10

1478. **CHARCOAL STICKS**, natural willow wood, 4x1x½ inches. Per dozen .50

2804. **CHART, Atomic Weight.** Compiled by Dr. F. W. Clarke and reported to the American Chemical Society. Corrected up to 1918. Size 42x62 inches. Mounted on linen back on common rollers 2.50

PERIODIC CLASSIFICATION OF THE ELEMENTS

ACCORDING TO MENDELEJEFF
ON BASIS O=16
REVISED AND CORRECTED TO 1918 BY DR. F. W. CLARKE.

Series	Group 0	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
1		H-1							
2	He-4	Li-7	Be-9	B-11	C-12	N-14	O-16	F-19	
3	Ne-20	Na-23	Mg-24	Al-27	Si-28	P-31	S-32	Cl-35.5	
4	A-39.9	K-39.1	Ca-40.1	Sc-44.1	Ti-48.1	V-51.2	Cr-52.1	Mn-55	Fe-55.9 Ni-58.7 Co-59.
5			Cu-63.6	Zn-65.4	Ga-70	Ge-72.5	As-75	Se-79.2	Br-79.95
6	Kr-81.8	Rb-85.5	Sr-87.6	Y-89.	Zr-90.6	Nb-94	Mo-96		Ru-101.7 Rh-103 Pd-106.5
7			Ag-107.93	Cd-112.4	In-115	Sn-119	Sb-120.2	Te-127.6	I-126.97
8	Xe-128	Cs-132.9	Ba-137.4	La-138.9	Ce-140.25				
9									
10						Ta-181	W-184		Os-191 Ir-193 Pt-194.8
11			Au-197.2	Hg-200	Tl-204	Pb-206.9	Bi-208		
12			Ra-225		Th-232.5		U-238.5		

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SOME OF RARER ELEMENTS NOT LOCATED - PLACE UNCERTAIN

REPRODUCED BY PERMISSION OF
LABORATORY APPARATUS
AND SUPPLIES

No. 2806.

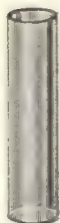
2806. **CHART, Mendelejeff Periodic System.** The periodic arrangement of the elements according to Mendelejeff, on the basis of O=16. Revised and corrected up to 1918 by Dr. F. W. Clarke. American nomenclature. Size 42x62 inches. Mounted on linen back on common rollers. 2.50

CHARTS, for Botany, Zoology and Physiography, send for special bulletin.



No. 2807.

2807. **CHART, Metric**, showing in full size and in perspective where necessary the units of the international metric system, with units of the English system for comparison. Tables showing the derivation of the names of the metric units and their abbreviations, together with tables of metric and English equivalents are included. The chart is 25 by 41 inches, mounted on cloth back, with common rollers..... \$2.00
2808. **CHART, Spectrum**, showing 6 spectrum and 12 intermediate colors with two tints and two shades of each. A chart of approximately complementary colors, one showing the relative value of spectrum colors as obtained by a prism, and a set of grays, showing eight tones are included. 2.00
2812. **CHART, Spectrum**, mounted on linen back with common rollers and containing the following spectra (size of each spectrum 5.5 cm wide, 52 cm long): K, Rb, Cs, Tl, Na, Li, Ca, Sr, Ba. 5.50
2814. **CHART, Spectrum**, same as No. 2812, with the following spectra: In, C, Bo, Mn, Pb, Cu, Co, Ni, Fe..... 5.50



No. 2822.



No. 2824.



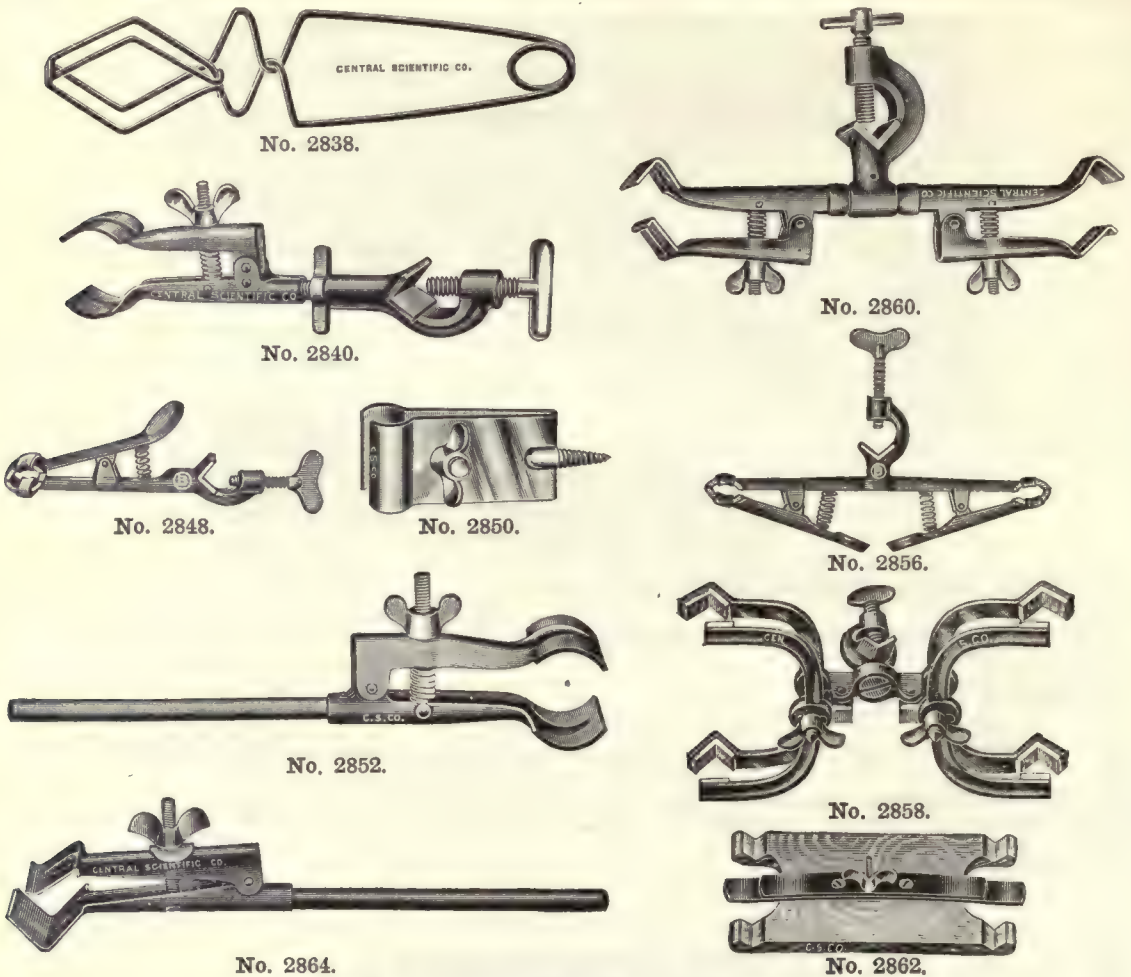
No. 2830



No. 2828.

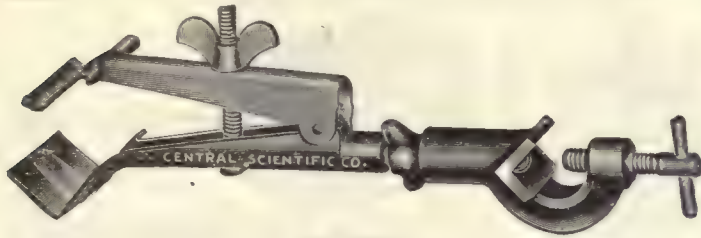
No. 2818. No. 2820.

- | | | |
|--|-----------|------|
| 2816. CHEESE-CLOTH | Per yard | .12 |
| 2818. CHIMNEYS, Students' Lamp | Per dozen | 1.80 |
| 2820. CHIMNEYS, Argand, straight, 2x7 inches | Per dozen | 1.20 |
| CLAY PIPES, see Pipes, Clay. | | |
| CLOTH, Emery, see Emery Cloth. | | |
| 2822. CHISEL, Cold, length 6 inches, width of blade 1/2-inch | | .18 |
| 2824. CHISELS, Gouge, cast steel, with wood handle. | | |
| No. | A | B |
| Width of blade, inches..... | 1/2 | 1 |
| Total length, inches..... | 13 | 14 |
| Each | .90 | 1.10 |
| 2826. CHISELS, Plain, cast steel, with wood handle. | | |
| No. | A | B |
| Width of blade, inches..... | 1/2 | 1 |
| Total length, inches..... | 13 | 14 |
| Each | .80 | 1.10 |
| 2828. CHLORINE ABSORPTION APPARATUS, Bunsen-Fresenius, with flask ground on | | 1.40 |
| 2830. CHLORINE TUBE, 2x100 cm, for showing decomposition of water by chlorine | | .80 |



CLAMPS, ALL KINDS

2838.	CLAMPS, Beaker, Chaddock's.		
	No.	A	B
	For beakers, cc.	75 to 250	250 to 550
	Each	\$0.20	.20
2840.	CLAMP, Burette, of stamped steel with rounded jaws; has check nut to adjust to any position, and clamp holder. An excellent clamp for general use		\$0.40
2842.	CLAMP, Burette, same as No. 2840, but with jaws rubber covered.....		.45
2844.	CLAMP, Burette, same as No. 2840, but made entirely of brass.....		.80
2846.	CLAMP, Burette, same as No. 2844, but with jaws rubber covered.....		.85
2848.	CLAMP, Burette, of japanned iron, with coiled spring enabling burette to be adjusted easily and quickly. With rubber covered jaws.....		.60
2850.	CLAMP, Burette, or tube, of brass nickel-plated, for screwing into wall or shelf. Open in front leaving graduations uncovered for reading.....		.40
2852.	CLAMP, Burette, Bunsen, of stamped steel with rounded jaws, for use with clamp holder No. 2914; for tubes, burettes, etc. Width of opening, 2 inches; total length, 9 inches; diameter of rod, 3/8 inches .....		.30
2854.	CLAMPS, Burette, Bunsen, same as No. 2852, but with rubber covered jaws.....		.35
2856.	CLAMP, Burette, double, same as No. 2848, for two burettes.....		.70
2858.	CLAMP, Burette, double, of brass, jaws cork lined		3.00
2860.	CLAMP, Burette, Hofmann's, double.....		.36
2862.	CLAMP, Burette, double, designed by Prof. Lincoln of the University of Illinois. Burettes are held perpendicular and are easily removed. A very convenient and rigid clamp, nicely made.		1.10
2864.	CLAMP, Condenser, new form, with V shaped jaws of stamped steel, enabling very small tubes to be clamped. For clamping thermometers, burettes, condensers, etc. For tubes up to 2 1/2 inches; total length, 11 inches; diameter of rod, 3/8 inch.....		.50
2865.	CLAMP, Condenser, same as No. 2864, but with rod 12 inches long. Total length, 17 inches.		.60
F151.	CLAMP, Condenser, same as No. 2864, but with nickel-plated rod 12 inches long.....		.70



No. 2868.



No. 2870.



No. 2876.



No. 2874.



No. 2880.



No. 2878.



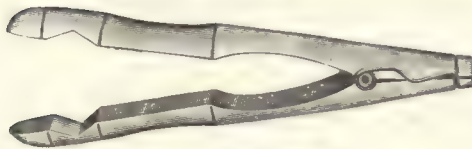
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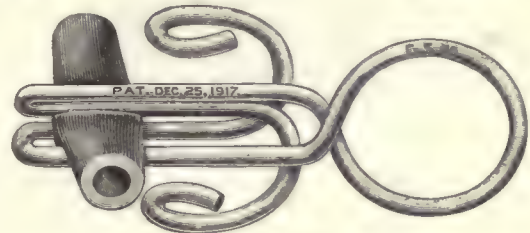
No. 2884.



No. 2886.



No. 2872.



No. 2888.

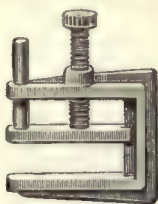
2868. **CLAMP, Condenser**, same as No. 2864, with check nut to adjust to any position, and with clamp holder attached \$0.90
2870. **CLAMP, Dish, Stoddard's**, of brass, white-plated, for holding evaporating and other dishes up to 4½ inches in diameter..... .16
2872. **CLAMP, Flask**, for flasks and large tubes, of wood, with wire spring. Length, 10½ inches. .60
2874. **CLAMP, Test Tube**, of wood, improved form with brass spring..... .12
2876. **CLAMP, Test Tube**, of spring wire, nickel-plated, with improved finger rests. Length, 6½ inches16
2878. **CLAMP, Test Tube, Chaddock's**, of japanned wire, shaped as shown in illustration..... .20
2880. **CLAMP, Test Tube, Stoddard's**, of spring wire. Length, 4¾ inches. (See No. 2918 Clamp Holder.)10
2882. **CLAMPS, Tubing, Cut-off**, of brass, nickel-plated.
- | | | |
|-------------------------------|------|------|
| No. | A | B |
| For tubing up to, inches..... | 3/16 | 5/16 |
| Each | .06 | .09 |
| Per dozen | .55 | .90 |
2884. **CLAMPS, Tubing, Mohr's Pinchcock**, of brass spring wire, nickel-plated.
- | | | | |
|-------------------------------|------|-----|-----|
| No. | A | B | C |
| Total length, inches..... | 2½ | 3 | 3½ |
| For tubing up to, inches..... | 5/16 | 3/8 | 1/2 |
| Each | .10 | .12 | .16 |
2886. **CLAMP, Tubing, Mohr's Pinchcock**, of rectangular wire, giving a flat bearing surface on the tubing 3 mm wide, insuring close contact and safe guarding the tubing. Made of stiff spring brass white-plated, with flat finger grips. Length, 2½ inches; for tubing up to ¾ inch.20
2888. **CLAMPS, Tubing, Spring Pinchcock, Day's, Patented**. Can be placed on or removed from rubber tubing without disconnecting apparatus. The most serviceable pinchcock made. Constructed of strong brass spring wire, white-plated.
- | | | |
|-------------------------------|------|------|
| No. | A | B |
| Length, inches..... | 2¾ | 25/8 |
| For tubing up to, inches..... | 5/16 | 3/8 |
| Each | .08 | .09 |



No. 2890.



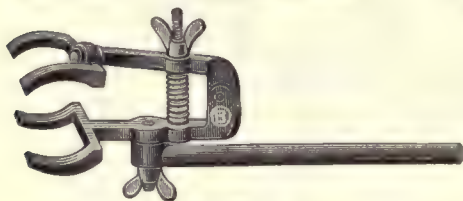
No. 2890 (open).



No. 2896.



No. 2904.



No. 2898.



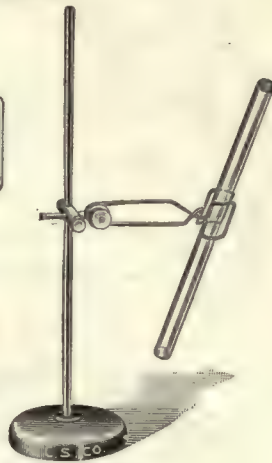
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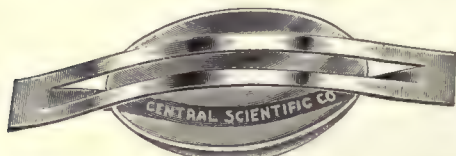
No. 2916.



No. 2894.



No. 2918.

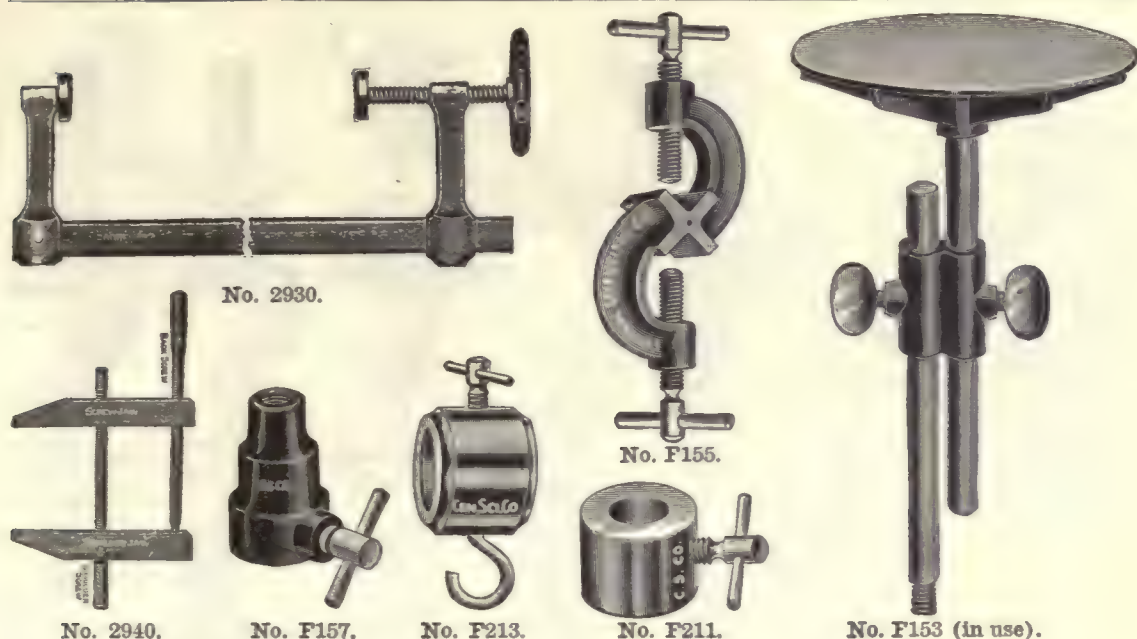


No. 2902.



No. 2906.

2890. **CLAMPS, Tubing, Screw Compressor**, new form, of brass nickel-plated; a combination of Hoffmann's and the old form; can be placed upon rubber tubing without disconnecting apparatus.
- | | | |
|-------------------------------|----------------|---------------|
| No. | A | B |
| For tubing up to, inches..... | $\frac{5}{16}$ | $\frac{1}{2}$ |
| Each | \$0.20 | .25 |
2892. **CLAMP**, same as No. 2890, but extra heavy, for pressure tubing up to $\frac{1}{2}$ inch inside diameter. .35
2894. **CLAMP, Tubing, Bunsen's Screw Compressor**, of brass, nickel-plated, for heavy rubber tubing. Size, $\frac{3}{4}$ by $1\frac{1}{2}$ inches..... .40
2896. **CLAMPS, Tubing, Hoffmann's improved form**, nickel-plated with open jaw.
- | | | |
|-------------------------------|---------------|---------------|
| No. | A | B |
| For tubing up to, inches..... | $\frac{1}{2}$ | $\frac{3}{4}$ |
| Each | .22 | .28 |
2898. **CLAMPS, Universal**, with swivel jaws adapting themselves to irregular shapes; with check nut enabling object to be held at any angle. For use with Clamp Holder No. 2914.
- | | | |
|------------------------------|-----|-----|
| No. | A | B |
| For tubes up to, inches..... | 2 | 3 |
| Total length, inches..... | 8 | 10 |
| Each | .65 | .85 |
2900. **CLAMPS, Universal**, same as No. 2898, with jaws rubber covered.
- | | | |
|------------|-----|-----|
| No. | A | B |
| Each | .70 | .90 |
2902. **CLAMP, Watch Glass**, of brass, nickel-plated, for watch glasses up to $2\frac{1}{2}$ inches in diameter .12
2904. **CLAMP, Watch Glass**, of brass spring wire, for watch glasses up to 3 inches in diameter... .10
2906. **CLAMP**, with brass hook for supporting thermometers and other apparatus; with screw for attaching to support rods..... .75
2914. **CLAMP HOLDER**, of iron with brass screws, for fastening clamps to support rods up to $\frac{9}{16}$ inch in diameter35
2916. **CLAMP HOLDER**, same as No. 2914, with swivel, for attaching clamps at any angle.... .50
2918. **CLAMP HOLDER, Stoddard's**, an ingenious device for rigidly holding Stoddard Wire Test Tube Holder No. 2880 in any position. Provides for vertical and horizontal adjustment to any angle, and will adapt itself to a great many uses in the laboratory. Clamp holder with right angle clamp, but without Test Tube Holder No. 2880..... .44
2919. **CLAMP HOLDER** only of No. 2918..... .16
2920. **RIGHT ANGLE CLAMP** only of No. 2918. Has one $\frac{7}{32}$ -inch hole and one $\frac{1}{4}$ -inch hole... .28
2922. **BASE AND ROD** for use with No. 2918 as shown in illustration. Base is heavy, and stable even with excessive load; rod is $15 \times \frac{7}{32}$ inches..... .60



CLAMPS, GENERAL LABORATORY

The clamps listed in this section differ from the usual chemical laboratory clamps in that they are carefully machined to secure perfect alignment of apparatus with which they are used. All V's are accurately milled, holes are carefully reamed and faces are smoothly planed. They should be selected whenever it is essential to have apparatus assembled with an accurate arrangement of parts.

2930. CLAMPS, Adjustable, steel. These clamps are so constructed that they can be quickly adjusted and will lock themselves the moment the pressure is applied to the screw. The bar is $3\frac{1}{4}$ inches from the center of screw. A very desirable clamp for light or medium work.

No.	A	B	C
Maximum opening, inches.....	6	10	18
Each	\$1.10	1.30	1.80

F211. COLLARS, with set screw, allowing a clamped rod to rotate freely, and at the same time preventing motion along the axis. The two smaller sizes are of brass, nickel-plated; the others of iron, neatly japanned. No.

No.	A	B	C	D
For rods of diameter, mm.....	10	13	19	30
Each	\$0.40	.50	.60	.80

F213. HOOK COLLARS, with set screw, of substantial construction. The many uses to which such a piece may be put will readily be seen. The two smaller sizes are of brass, nickel-plated and the other of cast iron, neatly japanned.

No.	A	B	C
For rods of diameter, mm.....	10	13	19
Each .....	.60	.70	.80

F153. CLAMPS, Extension, for holding two rods parallel to each other. (The illustration shows the clamp in use with two rods and an iron table top.)

No.	A	B	C
For rods of diameter, mm.....	10	13	19
Each .....	.50	.70	1.00

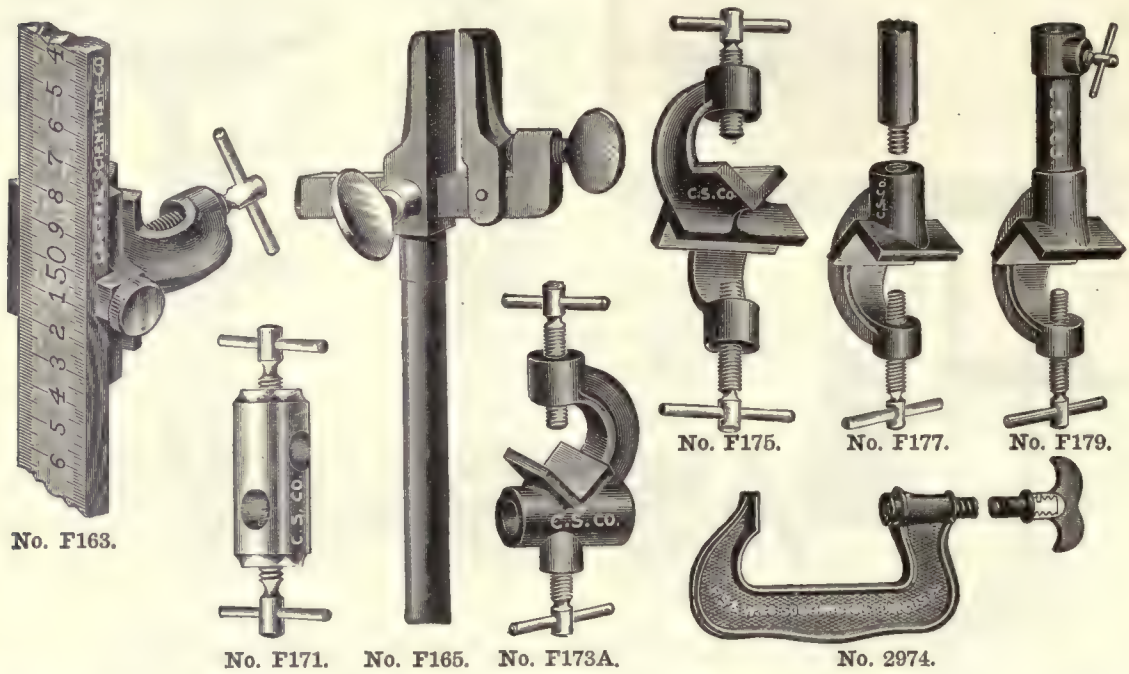
2940. CLAMPS, Hand Screw, wood, with saw cut threads on screws.

No.	A	B	C	D	E
Length of jaws, inches.....	5	7	8	10	12
Opening, inches.....	2	3	4½	5½	8½
Each .....	.55	.65	.80	1.00	1.25

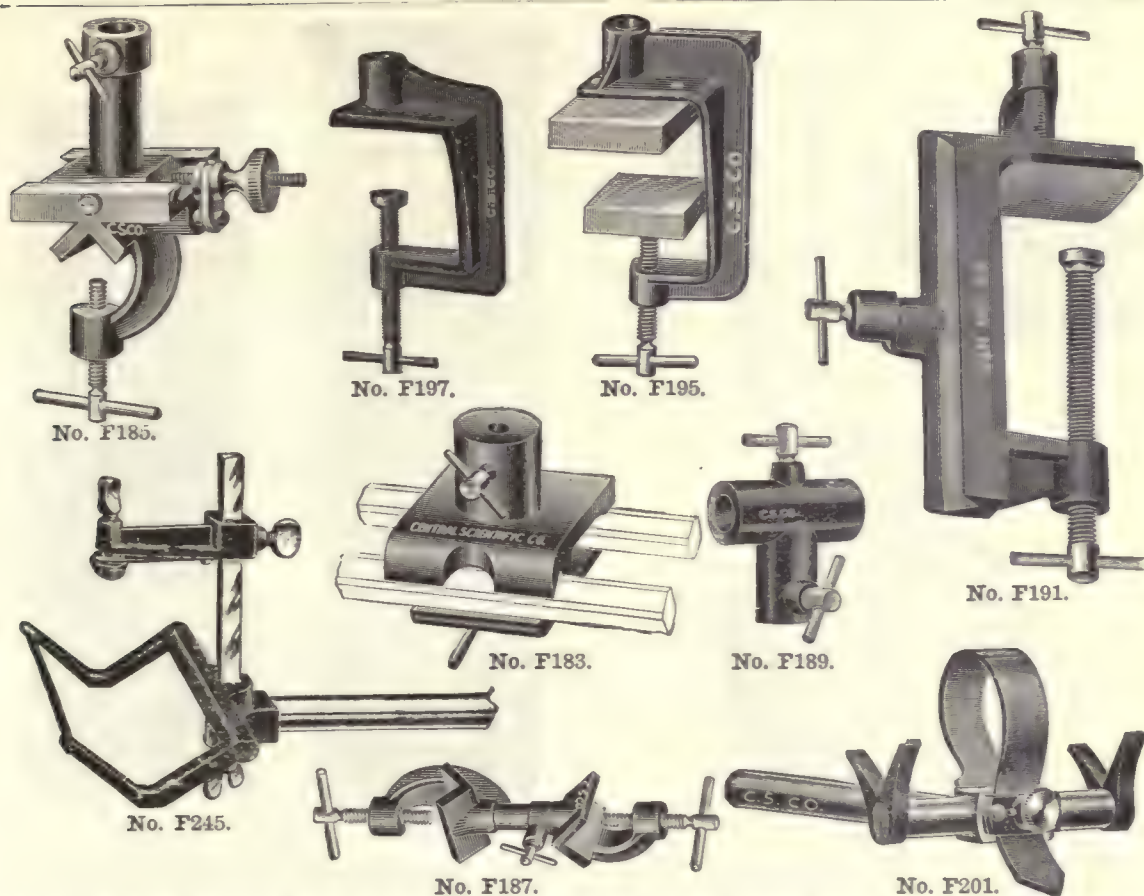
F155. CLAMP, Extension, for holding two rods parallel to each other. By using this clamp it is possible to fasten two rods parallel to each other without slipping the clamp over the end of the rods, as was necessary in the old form. For use with rods of from 10 to 19 mm diameter. \$0.70

F157. CLAMPS, Extension, for holding two rods in line. The lower end is reamed to fit the top of the lower rod and is provided with a set screw; upper end is tapped to receive the upper rod.

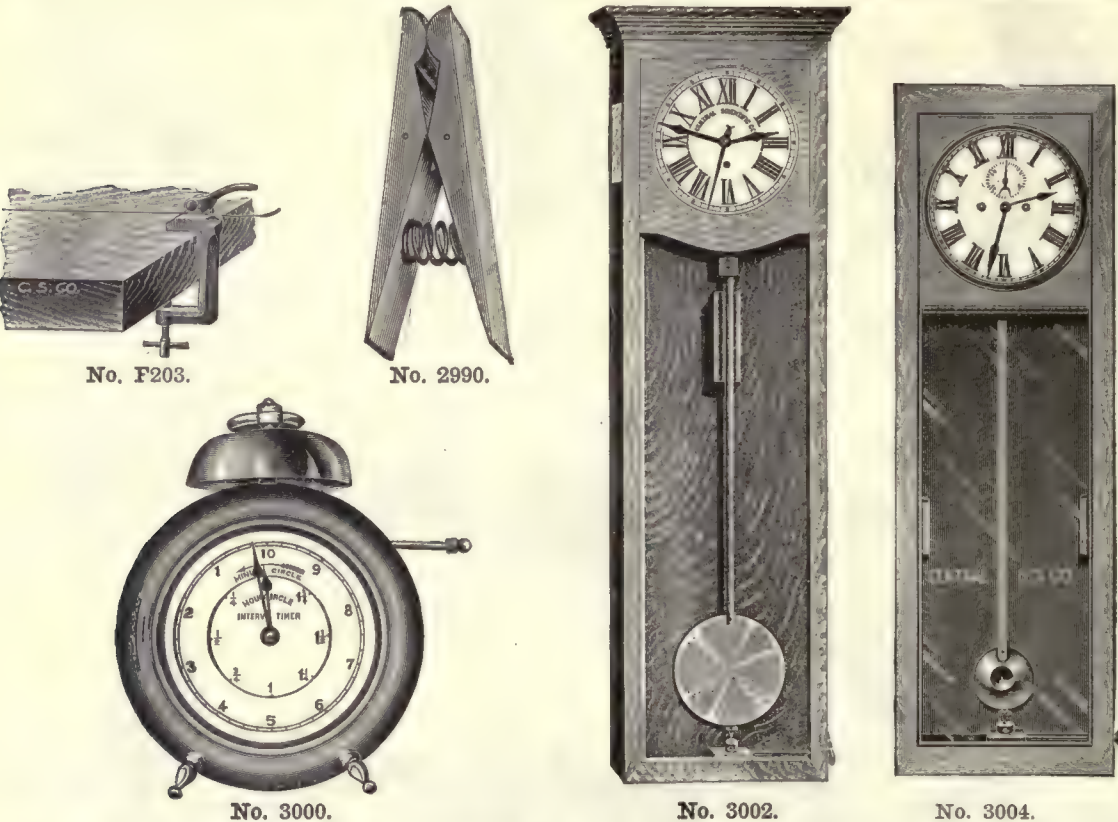
No.	A	B	C	D
For lower rod of diameter, mm.....	13	19	13	19
For upper rod of diameter, mm.....	13	19	10	13
Size of thread of upper rod.....	¾-16	½-12	¼-20	¾-16
Each .....	.55	.65	.55	.65



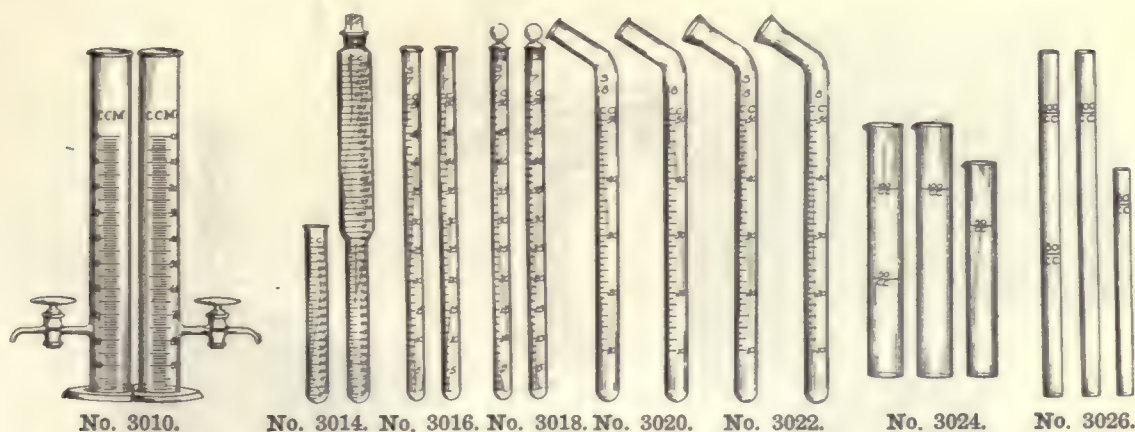
- F163. CLAMP, Meter Stick.** A convenient device for holding the ordinary meter stick in position on a rod, with V opening for clamping it to any rod from 10 to 19 mm in diameter. The meter stick is held firmly in place parallel to the rod by a thumb screw..... \$0.55
- F165. CLAMPS, Parallel-Jawed,** of brass, nickel-plated, for holding square objects, mirrors, scales, screens, etc. Maximum opening of jaw, 4 cm. Rod 10 mm in diameter.
- | | | |
|----------------------|------|------|
| No. | A | B |
| Rod, length, cm..... | 10 | 20 |
| Each | 1.70 | 1.80 |
- F171. CLAMP, Right Angle,** of brass, nickel-plated. To hold two 10 mm rods accurately at right angles to each other..... .50
- F173. CLAMP, Right Angle,** of iron, neatly japanned. Size B and C have zero indicator for optical bench accessories.
- | | | | | |
|---|-----|-----|-----|------|
| No. | A | B | C | D |
| V opening for rods of diameter, mm..... | 13 | 19 | 19 | 30 |
| Hole for rods of diameter, mm..... | 10 | 13 | 6 | 19 |
| Each | .50 | .60 | .60 | 1.00 |
- F175. CLAMP, Right Angle,** of iron, neatly japanned, with two V openings at right angles.
- | | | |
|--|-----|-----|
| No. | A | B |
| V openings for rods of diameter, mm..... | 13 | 19 |
| Each | .50 | .60 |
- Note:**—For less expensive right angle clamps, see No. 2914 Clamp Holder.
- F177. CLAMP, Right Angle.** One 19 mm V opening. Tapped ¼-20 to receive 10 mm rod..... .60
- F179. CLAMP, Right Angle,** for lens holders, telescope supports, pulleys, etc., with zero indicator for photometer and optical bench accessories. Carefully made so that the rod will be held perpendicular to the V. The V opening is for rods 19 mm in diameter.
- | | | |
|------------------------------------|-----|-----|
| No. | A | B |
| Hole for rods of diameter, mm..... | 10 | 13 |
| Each | .60 | .90 |
- F180. CLAMP, Right Angle,** same as No. F179A, with addition of a spring so that it can be moved along the rod without loosening the set screw. Convenient for carrying photometer box. 1.50
- 2974. CLAMPS, Standard,** made of malleable iron, and provided with ball and socket swivel cap on screw.
- | | | | |
|----------------------|-----|-----|------|
| No. | A | B | C |
| Opening, inches..... | 3 | 4 | 6 |
| Each | .70 | .85 | 1.30 |



- F183. CLAMP, Support, Bridge Form.** For use with double rod optical bench or photometer, made up of No. F303 End Supports and a pair of 19 mm square rods. Is easily clamped to the rod by a slight movement of the handle seen in the illustration. Provided with an index line or zero indicator in the same plane with the vertical hole, which is 10 mm in diameter..... \$3.00
- F185. CLAMP, Support, Screw Adjustment.** For same uses as No. F179 Right Angle Clamp, but designed to give a very fine adjustment in a plane perpendicular to the V. Provided with zero indicator. Range of adjusting screw, over 25 mm, V opening 19 mm, hole 10 mm..... 6.00
- F187. CLAMP, Swivel.** Very useful for holding pulleys, mirrors and lens supports where different angular directions are desired. Two 19 mm V openings, which can be clamped at any angle to each other in parallel planes..... 1.20
For less expensive **CLAMP**, with swivel, see No. 2916 Clamp Holder.
- F189. CLAMPS, T**, for holding two round rods at right angles to each other in the same plane.
- | No. | A | B |
|-------------------------------|-----|------|
| For rods of diameter, mm..... | 13 | 19 |
| Each | .65 | 1.10 |
- F191. CLAMP, Table**, of iron, for a table top 8 cm thick or less, with accurately milled V's at right angles to each other. To be attached to the edge of the table for holding 10 to 19 mm round or square rods, either horizontally or vertically. The broad flange is carefully milled and insures stability. The T-screw is swiveled for protection of the table..... 1.60
- F192. CLAMP, Table**, same as No. F191. For a table 11 cm thick or less..... 1.80
- F195. CLAMP, Table**, wooden jaws, for a table top 8.5 cm thick or less. Designed for use where there is danger of injury to the table top. Upper jaw, 8x18 cm; lower jaw, 8x10 cm. The large surface of jaws gives increased stability. The lower jaw is swiveled. Tapped $\frac{3}{4}$ -12 to receive 19 mm rod..... 2.25
- F197. CLAMP, Table.** Similar to No. F195, but without the wooden jaws. The flange at the top is broad so that injury to the table top is prevented. Tapped $\frac{3}{8}$ -16 to receive 13 mm rod..... .75
- F245. CLAMP, Telescope**, for telescopes, lenses and cylinders of any form and size as well as irregular objects up to 8 cm in diameter. Mounted on nickel-plated rod 20 cm long by 13 mm in diameter..... 3.00
- F201. CLAMP, Telescope.** Made of brass, for holding telescopes from 2 to 5 cm in diameter. The telescope is held in place by a leather strap and is therefore not liable to injury as is the case when metal clamps are used. A No. F133 Support Rod, 20 cm in length, is included, which may be placed either as shown in the illustration or in a position at right angles to this. The clamp is also tapped to receive a No. F131 Support Rod for carrying a scale..... 3.50



- F203. **CLAMP, Stone's Tension**, modified form, for use in experiments where it is desired to maintain a strain on a wire or cord and enable an individual operator to readily adjust the tension without the co-operation of a second person.
 This clamp is substantially made of cast iron and neatly finished. Will fit any table or board 7 centimeters thick or less. Wires, cords, etc., are securely clamped by an eccentric lever, as shown in the illustration..... \$0.50
- 2990. **CLIPS, Spring**, of wood, for holding tubes, etc.....per dozen .20
- 3000. **CLOCK, Interval**. Alarm may be set to ring at the expiration of any interval from a quarter of a minute up to two hours. Does not start until the alarm is wound, and stops with the ringing of the alarm. Valuable in all experiments in which action for a definite length of time is necessary, as the operator is free to go on with other duties without fear of overrunning the time. Many uses of this timer will readily present themselves. Well made and reliable. \$4.00
- For **TIME SWITCH** for use with No. 3000, see No. 13810.
- 3002. **CLOCK, Laboratory**. This is the best clock we can furnish, adapted to the needs of the average laboratory. It is an eight-day Waltham movement, weight-driven clock, and we guarantee it to be a reliable timekeeper.
 The dial is 12 inches in diameter with seconds divisions. It is provided with hour and minute hands and a full sweep seconds hand for timing laboratory experiments.
 The pendulum is full seconds length, and provided with an adjustable platinum contact and a mercury well of improved construction, adjustable from the outside of the case, is mounted in correct position.
 The clock is completely enclosed in a polished oak case, with glass front and glass covered opening in the sides opposite the works, and binding posts on the outside for attaching battery and sounder 150.00
- 3004. **CLOCK, Laboratory**. An eight-day clock with good movement, driven by two weights. The dial is 12 inches in diameter and the pendulum beats seconds. The clock is provided with mercury contact adjustable from the outside of the case, and with binding posts for electrical connections. Complete in polished oak case with glass door..... 55.00
- 3006. **CLOTH, Tracing**, thin, good quality.
 Width, inches 30 36 38 42
 Per yard90 1.00 1.25 1.75
- 3008. **CLOTH, Cotton, Turkey Red**, used to show bleaching effect of chlorine.....per yard .25



COLOR COMPARISON TUBES

3010. **COLOR COMPARING CYLINDERS, Hehner**, for the estimation of iron in water, consisting of two graduated tubes of the same size and graduation, with stop-cocks and metal feet..per pair \$6.00

3014. **COLOR COMPARISON TUBES, Camp**, graduated for manganese determination in steel. Larger tube has glass stopper ground in.....per set 6.00

COLOR COMPARISON TUBES, Eggertz, for the estimation of carbon and manganese in steel by the colorimetric method.

No.	A	B	C
Capacity, cc.....	30	50	100
Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$
3016. Per set of two.....	3.00	3.60	5.00
3017. Per set of four.....	6.00	7.20	10.00

COLOR COMPARISON TUBES, Eggertz, same as No. 3016, but with ground in glass stopper.

No.	A	B	C
Capacity, cc.....	30	50	100
Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$
3018. Per set of two.....	3.90	4.50	5.90
3019. Per set of four.....	7.80	9.00	11.80

COLOR COMPARISON TUBES, Julian's, same as No. 3016, but with bent ends to permit mixing of contents without using a stopper. The lower portion of the tube is ungraduated.

No.	A	B	C
Graduated from, cc.....	5 to 30	10 to 50	10 to 70
Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$
3020. Per set of two.....	3.30	4.20	4.80
3021. Per set of four.....	6.60	8.40	9.60

COLOR COMPARISON TUBES, Julian's, same as No. 3020, but with funnel tops to facilitate pouring in the sample.

No.	A	B	C
Graduated from, cc.....	5 to 30	10 to 50	10 to 70
Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$
3022. Per set of two.....	3.50	4.40	5.00
3023. Per set of four.....	7.00	8.80	10.00

3024. **COLOR COMPARISON TUBES, Nessler**, usual form for ammonia test, of clear colorless glass with polished bottoms.

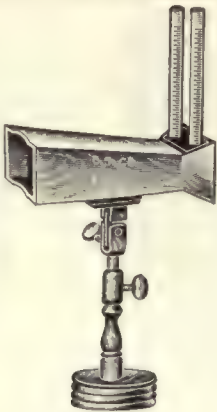
No.	A	B	C
Graduated at, cc.....	50	100	50 & 100
Each.....	.65	.80	.90

COLOR COMPARISON TUBES, Nessler, American Public Health Association Standard. Tall form of clear glass with polished bottoms. Graduations agree within 6 mm and are about 210 mm on 50 cc tube and 325 mm on the 100 cc tube from the bottom. (See Standard Methods of Water Analysis for 1915, pages 16 and 18.) In sets to agree.

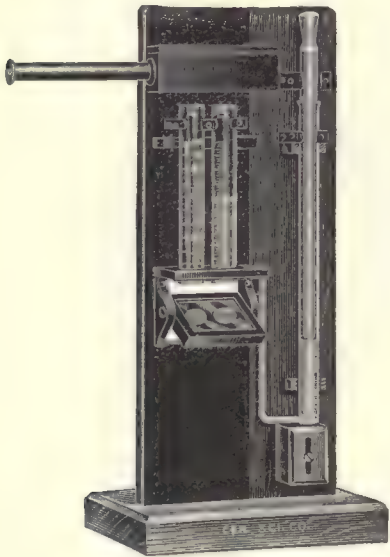
No.	A	B	C
Graduated at, cc.....	50	100	50 & 100
Each.....	.85	1.30	1.60
3027. Per set of six.....	5.80	8.60	10.55
3028. Per set of twelve.....	12.00	18.00	22.50



No. 3029.



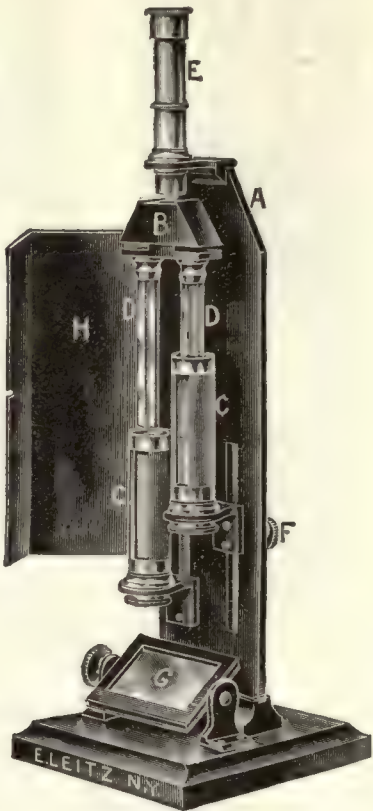
No. 3030.



No. 3040.



No. 3032.



No. 3044.

3029. **STAND** for Nessler Tubes, of wood stained black, with base covered with milk glass plate. For twelve tall form 50 cc tubes. Without tubes \$5.00
3030. **CAMERA** for use with color comparison tubes. Improved form, so constructed that the shadow of the edge of the box cannot be thrown on the tubes; with blue and ground glass..... 12.00
3032. **COLOR TUBE**, of brass, 24 inches long, 2½ inches in diameter, closed at end by polished plate glass, held in place by a screw cap. Easily cleaned 12.00

COLORIMETERS

3040. **COLORIMETER**, Campbell-Hurley, for use in determining carbon in steel, for water and urine analysis, and in general colorimetric work. The telescope attachment furnishes a circular field divided vertically, rendering comparisons rapid and exact. The color of the standard solution is controlled by raising and lowering a glass plunger in a reservoir attached to one tube. Complete as illustrated with standard cylinder graduated to 100 cc in 1 cc divisions, and with cylinder for unknown graduated to 100 cc in 10 cc divisions. (See *Journal of the American Chemical Society*, Vol. XXXIV, No. 7, for July 1912)..... 20.00
3041. **GRADUATED CYLINDER** only for No. 3040, for unknown solution..... 1.25
3042. **GRADUATED CYLINDER** only for No. 3040, with attached reservoir and glass plunger, for standard solution 4.00
3044. **COLORIMETER**, Duboscq, the standard instrument for the determination of nitrogen, urea, ammonia, creatine, and creatinine in blood and urine according to the methods of Dr. Otto Folin. Also used for a variety of other determinations in physiological and analytical chemistry. Will yield results accurate to within one per cent. Height of glass cylinders, 10 cm..... 120.00

Accessories for No. 3044.

3045. **GLASS CYLINDER**, 10 cm high..... 3.50
3046. **Glass Plunger**, 10 cm high..... 7.50



No. 3050.



No. 3050A.

3050. **COLORIMETER, Hess-Ives Tint Photometer**, for comparing different shades and hues of light colored materials or liquids with each other and with fixed standards. The instrument is used like a telescope, presenting to the eye a circular field with vertical hairline central division, one side of which is filled with light passing through a slit directly from a standard white magnesia block, while the other is filled with light passing through a slit from the sample whose color is to be evaluated. The slits are adjustable in width, and are provided with graduated scales from which a direct comparison of the degree of whiteness of two samples may be read. The light coming from the slits is thoroughly mixed and spread across the half fields by means of a patented revolving optical mixing wheel inserted between the slits and the field lens.

Comparisons of colors may be made just as readily by making successive measurements through three color screens, pure red, green and blue-violet. The instrument eliminates entirely the personal equation and offers a fixed standard of color measurements which may readily be reproduced.

This instrument is especially adapted for use with oils, paper, flour, sugar, soaps, pigments, etc. Complete as described with motor for operating optical mixing wheel, on adjustable supports \$175.00

- 3050A. **CABINET** for No. 3050, constructed of hardwood, nicely finished and provided with drawers and cabinets for the storage of accessories. This cabinet provides a convenient and portable dark room for color measurements..... 60.00

3051. **DAYLIGHT LAMPS** for use with No. 3050, providing a definite and constant illumination.

No.	A	B
For volts	110	220
Each	20.00	20.00



No. 3048.

No. 3052.

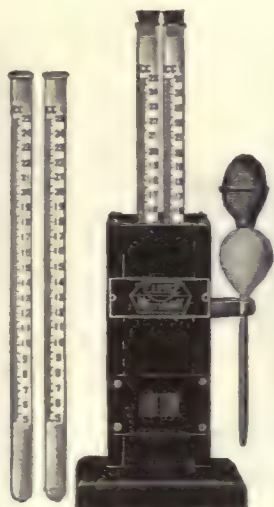
3048. **COLORIMETER, Dunning**, for estimating the quantity of phenol-sulphone-phthalein excreted when applying the Rowntree-Gerahty renal functional test. Complete with colorimeter box, empty ampoule, and 13 calibrated test ampoules varying in color, in polished wooden box, $2\frac{1}{2} \times 3\frac{1}{2} \times 5$ inches. (See Journal of Pharmacology and Experimental Therapeutics, Vol. I, No. 6, for July 1910, page 579; also the Journal of the American Medical Association, Vol. LVII, No. 10, page 811)..... \$6.00
3049. **PHENOL-SULPHONE-PHTHALEIN AMPOULES**, for use with No. 3048, containing sterile, biologically standardized solution of the mono-sodium salt, of strength 6 mg to each cc; in box of 10 ampoulesper box 1.00
3052. **COLORIMETER, Kuttner's Micro**, for directly estimating haemoglobin and sugar in the blood; uric acid, creatine, and creatinine in blood and urine; and for determining the renal function according to the method of Rowntree and Gerahty. The instrument consists of a closed upright box $2.5 \times 2.5 \times 8.5$ cm, with openings for the graduated and the standard color tubes. The tubes are viewed through a window in the front provided with a Helmholtz double plate, which shows the colors in a continuous band, rendering the comparison very exact. A sliding door forms the front of the box and affords protection to the prism. The size of the outfit enables it to be carried in the pocket. Complete with housing of hard rubber with Helmholtz double prism and sliding door; one each pipettes 25 cmm, 0.1 cc, 0.2 cc, and 2 cc; two graduated 10 cc test tubes; one transfer pipette; graduated solution tube holding 140 cmm; and pocket carrying case with sufficient space for several standard color tubes. (See Journal of the American Medical Association July 17, 1915, pages 245 and 246; and April 29, 1916, pages 1370-1373) 18.00

Extra Parts for Kuttner Micro-Colorimeter.

3053. Colorimeter Housing, of hard rubber, with prism	8.00
3054. Pipette, graduated to 25 cmm.....	1.00
3055. Pipette, 0.1 cc, graduated in 0.01 cc.....	1.00
3056. Pipette, 0.2 cc, graduated in 0.02 cc.....	1.00
3057. Pipette, 2 cc, graduated in 0.2 cc.....	1.00
3058. Pipette, Transfer .....	.20
3059. Test Tube, graduated to 10 cc.....	.90
3060. Tube, Solution, for diluting unknown to match standard color, graduated to 140 cmm.....	1.50
3061. Pocket Carrying Case, with space for several standard color tubes.....	2.50

REAGENTS FOR KUTTNER MICRO-COLORIMETER.

	In glass stoppered bottles		
	1 oz.	2 oz.	4 oz.
Acid, Acetic, 1% solution for determining uric acid in blood.....	...	.25	.40
Acid, Hydrochloric, normal solution for determining creatine in urine. ....	...	.25	.40
Acid, Hydrochloric, $\frac{1}{10}$ normal solution for determining haemoglobin. ....	...	.20	.35
Acid, Picric, C. P., saturated solution for determining sugar in blood, creatine and creatinine in urine, and creatinine in blood.....	...	.50	1.00
Acid, Uric Reagent, for determining uric acid in renal calculi, urine, blood .....	.90	...	...
Colloidal Iron, 5% solution for determining uric acid in blood and urine, and creatinine in blood.....	...	.30	.50
Phenol-Sulphone-Phthalein, in sterile ampoules	per box of 10 1.00		



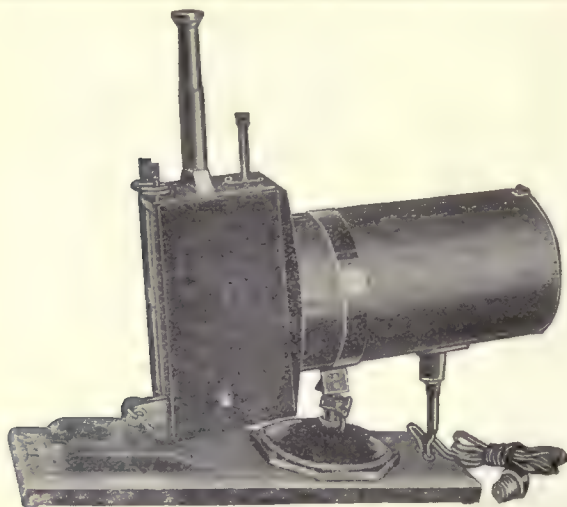
No. 3080.

REAGENTS FOR MICRO-COLORIMETER, Continued.

	In glass stoppered bottles		
	1 oz.	2 oz.	4 oz.
Sodium Acetate, C. P., saturated solution for determining uric acid in blood25	.40
Sodium Carbonate, saturated solution for determining uric acid in renal calculi, urine, blood.....25	.40
Sodium Carbonate, 10% solution for determining sugar in blood.....20	.35
Sodium Fluoride, 2% solution for determining sugar in blood.....	.40	...	...
Sodium Hydroxide, 10% solution for determining creatinine and creatinine in urine, creatinine in blood, and uric acid in renal calculi....30	.50

STANDARD COLOR SOLUTION TUBES FOR USE WITH KUTTNER MICRO-COLORIMETER, TESTED AND APPROVED BY DR. KUTTNER.

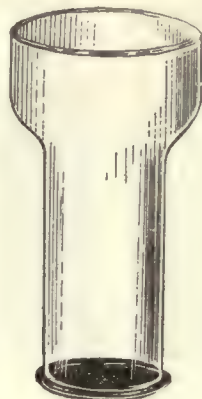
3068.	Haemoglobin Test Standard Tube, equivalent to 15 grams haemoglobin or 20 cc oxygen (O ₂)	2.00		
3069.	Carbonyl Haemoglobin Standard Tube, equivalent to 20% oxygen (O ₂)	5.00		
3070.	Sugar Test Standard Tubes, a set of two, A and B, the former being equivalent to 0.1 per cent. of sugar, the latter having twice that concentration.			
	No.	A	B	
	Per tube	1.00	1.00	
3071.	Phenol-Sulphone-Phthalein Test Standard Tubes, a set of three, the No. 1 tube reading directly in percentage, the Nos. 2 and 3 tubes being weaker in the proportions 2 and 4.			
	No.	1	2	3
	Per tube	1.00	1.00	1.00
3072.	Uric Acid Test Standard Tubes for determining uric acid in blood, a set of two, A and B, the former being equivalent to 0.01 mg and the latter to 0.005 mg.			
	No.	A	B	
	Per tube	1.00	1.00	
3073.	Uric Acid Test Standard Tube for determining uric acid in urine and stone, equivalent to 0.02 mg			1.50
3074.	Creatine and Creatinine Test Standard Tubes for urine, a set of two, A and B, the former equivalent to 0.01 mg, the latter to 0.02 mg.			
	No.	A	B	
	Per tube	1.00	1.00	
3075.	Creatinine Test Standard Tubes for blood, a set of two, A and B, the former equivalent to 0.01 mg, the latter to 0.02 mg.			
	No.	A	B	
	Per tube	1.00	1.00	
3080.	COLORIMETER, Myers, a simple and inexpensive outfit for clinical purposes, consisting of a box containing two tubes 26x1.2 cm graduated from 5 to 25 cc. Comparison of colors is made in the ungraduated part through an opening 2.2x1 cm against a white glass background. The unknown is diluted by the addition of water from the diluting pipette, until the colors match. Calculations are very simple. Complete with housing, filling pipette with rubber bulb, holder for pipette and two graduated tubes, in card-board box with directions for use. (See the Journal of Laboratory and Clinical Medicine, Vol. I, No. 10, for July 1916, page 760)			8.00



No. 3082.



No. 3088.

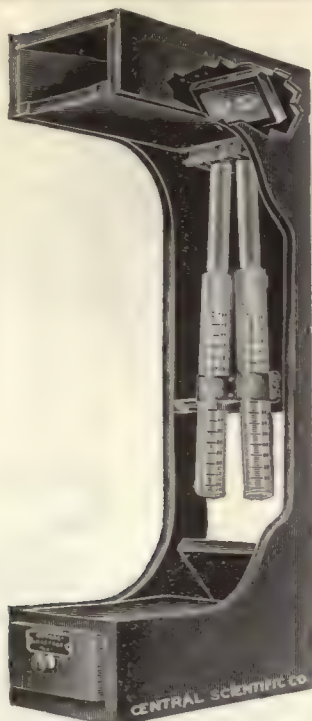


No. 3089.

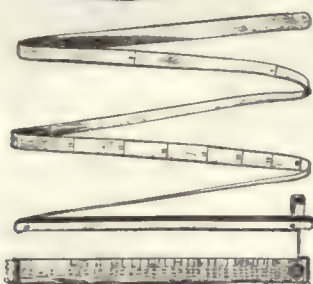
3082. **COLORIMETER, Kober Nephelometer**, for use in accurate colorimetric and nephelometric determinations in chemical and biological work, with any depth of liquid up to 110 mm. The optical parts are arranged to give a Lummer-Brodhun field, with the light from one side forming a square area enclosed by the circular area of light from the other side. The plungers are made of opaque black tubing with glass ends fused on, as are also the glass cups for colorimetric uses. The cups for nephelometric uses are made of clear glass tubing with black opaque glass bottoms fused on. The cups are raised and lowered by a screw with a double milled head, which gives the effect of a double adjustment. An accurately divided scale is provided, and the verniers are adjustable enabling the instrument to be set quickly at zero. The framework can be tilted like a microscope and securely clamped in any position. The source of light for nephelometric work is a concentrated filament lamp in front of which is mounted a condensing lens to bend the rays of light parallel. The reflecting mirrors are in pairs so that any inequalities in the light falling on the two sides of the instrument may be corrected. The entire instrument is enclosed in a metal housing which effectually cuts out any stray light and protects the parts from dust. Complete with 2 long and 2 short Colorimetric Cups No. 3090, 2 long and 2 short Nephelometric Cups No. 3091, Lamp-house with 110 volt lamp, cord and plug, mounted on a black polished board with switch; with directions for use. (See the Journal of Biological Chemistry, Vol. XXIX, No. 2, for March 1917, page 155)
- \$105.00

Parts and Accessories for No. 3082.

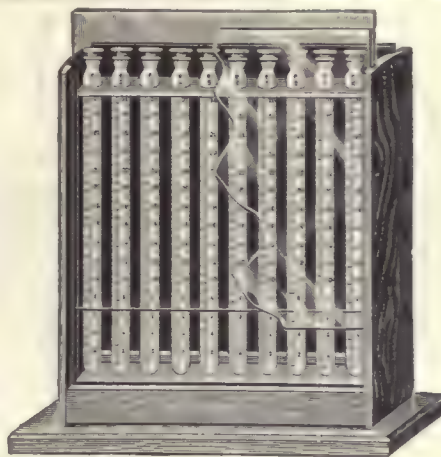
3083.	Lamp-House only, without lamp.....	27.50
3084.	Concentrated Filament Lamp for 110 volts.....	2.00
3085.	Zero Gage .....	.30
3086.	Plungers, of black glass with clear fused bottoms	per pair 4.00
3087.	Colorimetric Cups, of black tubing with blue bottoms, for use with artificial light.	
	No.	A B
	Style	long short
	Per pair	4.50 4.50
3088.	Colorimetric Cups, of black tubing with white bottoms, for use with daylight.	
	No.	A B
	Style	long short
	Per pair	4.00 4.00
3089.	Colorimetric Cups, of white tubing with blue bottoms, for use with artificial light. These are adapted for uses requiring that the liquid be kept under observation by the operator.	
	No.	A B
	Style	long short
	Per pair	3.50 3.50
3090.	Colorimetric Cups, of white tubing with white bottoms, for use with daylight.	
	No.	A B
	Style	long short
	Per pair	3.00 3.00
3091.	Nephelometric Cups, of white tubing with black bottoms.	
	No.	A B
	Style	long short
	Per pair	4.00 4.00
3092.	Portable Dark Room for use with No. 3082.....	35.00



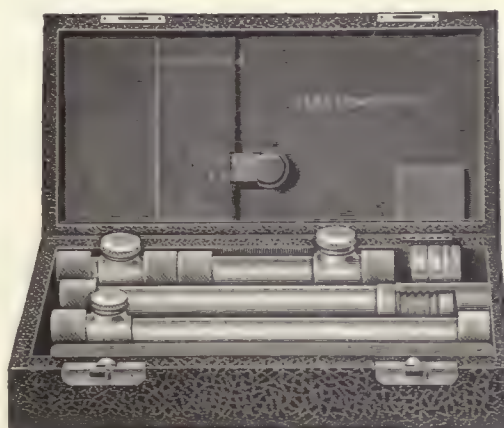
No. 3094.



No. 3102.

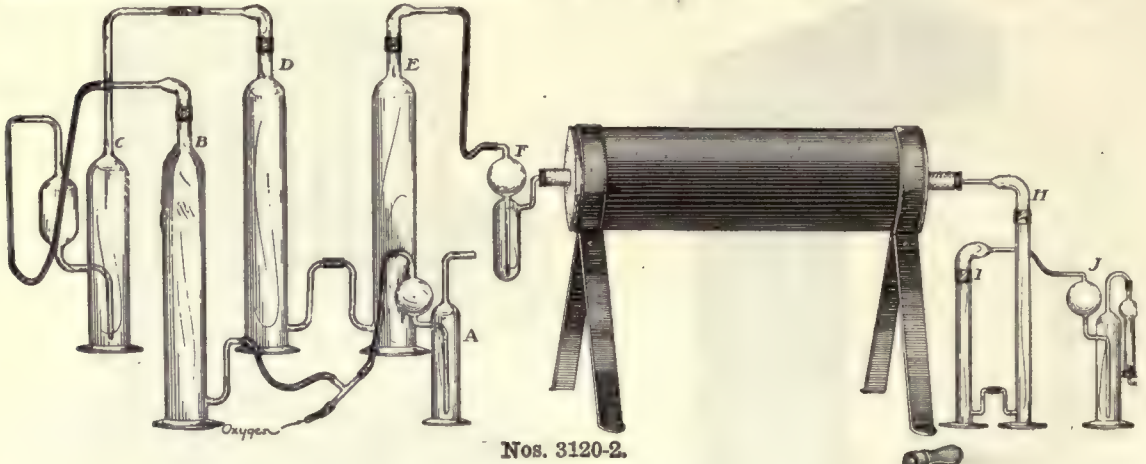


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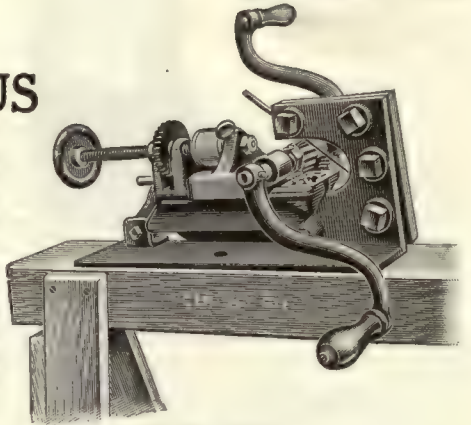
Nos. 3100-4.

3094. **COLORIMETER, Schreiner's**, as used in the Laboratory of the Bureau of Soils, United States Department of Agriculture. All parts of the instrument which come in contact with the solutions are of glass. The Colorimeter consists essentially of two graduated glass tubes which contain the standard and the unknown colorimetric solutions, with two smaller glass immersion tubes by means of which the length of the column of liquid in the graduated tubes may be changed. These tubes are mounted on the colorimeter stand by an improved method which makes their adjustment exceedingly simple and permits a rapid and easy setting while the comparisons are being made. Complete with graduated and plain tubes. (For full description see Journal of the American Chemical Society, Volume XXVII, September 9, 1905, and Bulletin No. 31, United States Department of Agriculture, Bureau of Soils)..... \$20.00
3095. **TUBES, Graduated**, for No. 3094, with 100 scale divisions, 2 mm apart.....per pair 5.00
3096. **TUBES, Immersion**, for No. 3094, 26 cm long with polished bottoms.....per pair .90
3098. **COLORIMETER, Ukena's Comparator**, widely used in determining carbon and manganese in iron and steel by the Eggertz method. Complete with stand, ground glass plate, and 10 Eggertz carbon tubes with ground stoppers, graduated to 30 cc in $\frac{1}{10}$ cc divisions..... 35.00
3100. **COLORIMETER, United States Geological Survey Standard Outfit**, for determining color in water analysis. The method consists in comparing the color of the water under examination with that of a series of glass disks, rated in color values according to the platinum-cobalt scale of parts of platinum per million. Colorimeter complete with 4 aluminum tubes, one with clips for holding disks, and others respectively 50, 100 and 200 mm long, for holding water to be tested; six standard disks of amber colored glass mounted in aluminum; in compact morocco covered case. (See Bulletin 151 of the United States Geological Survey)..... 38.50
3102. **TURBIDITY SCALE, United States Geological Survey Standard**, made of aluminum, 8 inches long and graduated in parts per million. To one end is attached a tape 4 feet long, similarly graduated. Into the other end is fastened a nickel-plated brass screw eye containing a piece of rolled platinum wire to be viewed. The depth of its disappearance to the eye indicates the turbidity. Complete in case..... 7.50
3104. **COLOR AND TURBIDITY OUTFIT**, consisting of Nos. 3100 and 3102, combined in morocco covered case 45.00



COMBUSTION APPARATUS

3120. COMBUSTION APPARATUS, C. M. Johnson's, for the determination of carbon in iron, steel, ferro-alloys, etc. With this outfit a single combustion can be completed in 25 minutes. Complete as illustrated with Hoskins Electric Combustion Furnace, mercury pressure gage, drying jar for solid absorbents, safety jar for potassium hydroxide solution, calcium chloride and soda lime jars, mercury valve, fused silica combustion tube, jar for granular zinc, jar for phosphorus pentoxide, absorption tube for carbon dioxide, and connections. (See "Rapid Methods for the Chemical Analysis of Special Steels, Steel Making Alloys, and Graphite," by C. M. Johnson.)



		No. 3134.	
No.		A	B
With furnace and rheostat for, volts.....		110	220
Each		\$50.00	50.00
3122. COMBUSTION APPARATUS, C. M. Johnson's, same as No. 3120, but with Multiple Unit Electric Combustion Furnace No. 6226.			
No.		A	B
With furnace and rheostat for, volts.....		110	220
Each		50.00	50.00

Parts for Johnson's Combustion Apparatus.

Hoskin's Electric Combustion Furnaces.

No.		A	B
For volts		110	220
6210. Furnace only		25.00	25.00
6211. Furnace with rheostat.....		33.50	33.50

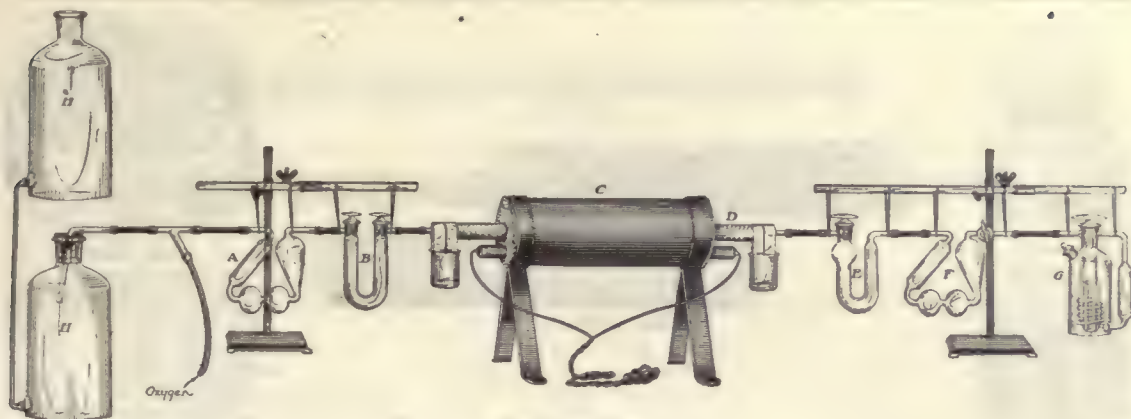
Multiple Unit Electric Combustion Furnace, for use on either 110 or 220 volts.

6226. Furnace only		25.00
6227. Furnace with rheostat (voltage must be specified)		33.50
3186B. Combustion Tube, of opaque fused silica for Nos. 3120 and 3122, 24 inches long and 3/4 inch inside diameter		6.00
3123. Mercury Pressure Gage, (A) to indicate leakage of joints or stoppage of flow.....		.90
3124. Jar for Solid Absorbent, (B) such as potassium hydroxide sticks.....		1.50
3125. Safety Jar, (C) for potassium hydroxide solution		1.50
3126. Calcium Chloride Jar, (D).....		1.50
3127. Soda Lime Jar, (E).....		1.50
3128. Mercury Valve, (F) to prevent back flow.....		.80
3129. Jar for Granular Zinc, (H) to absorb acid, lead, sulphur, and chlorine vapors.....		.80
3130. Jar for Phosphorus Pentoxide, (I) to absorb water .....		.60
3131. Absorption Tube, for Carbon Dioxide, (J) to be weighed for calculating percentage of carbon		1.00

Combustion Tube, Clay, C. M. Johnson's, see No. 3178.

3134. MILLING MACHINE, C. M. Johnson's, for obtaining iron and steel samples for use in combustion apparatus		42.00
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- 3136. "Rapid Methods for the Chemical Analyses of Special Steels, Steel Making Alloys, and Graphite" by C. M. Johnson, describing No. 3120 Combustion Apparatus		3.00
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Nos. 3138-40.

3138. **COMBUSTION APPARATUS, Vanier's**, for determining carbon in iron and steel by the combustion method. Complete as illustrated, with Hoskins Electric Combustion Furnace with rheostat, two four-liter aspirator bottles, potash bulb, calcium chloride tube, fused silica combustion tube, zinc tube, sulphuric acid bulb, Vanier's Combined Absorption Bulb and Drying Tube (patented), two $3\frac{3}{4} \times \frac{5}{8}$ inch Alundum combustion boats, $\frac{1}{2}$ lb. of R. R. Alundum and with necessary connecting tubing, supports, clamps, glass rods, etc., but without oxygen tank.
- | | | |
|------------------------------|---------|-------|
| No. | A | B |
| With furnace for, volts..... | 110 | 220 |
| Each | \$62.00 | 62.00 |
3140. **COMBUSTION APPARATUS, Vanier's**, same as No. 3138, but with Multiple Unit Electric Combustion Furnace No. 6226.
- | | | |
|---|-------|-------|
| No. | A | B |
| With furnace and rheostat for, volts..... | 110 | 220 |
| Each | 62.00 | 62.00 |

Parts for Vanier Combustion Apparatus.

Hoskins Electric Combustion Furnaces.

- | | | |
|-----------------|-----|-----|
| No. | A | B |
| For volts | 110 | 220 |
6210. Furnace only 25.00 25.00
6211. Furnace with rheostat..... 33.50 33.50
- Multiple Unit Electric Combustion Furnace**, for use on either 110 or 220 volts.
6226. Furnace only 25.00
6227. Furnace with rheostat (voltage must be specified) 33.50
- 1614F. Aspirator Bottles (H), four-liter, with rubber tube outlet at bottom, for use in keeping pressure constant, the lower one being filled with water each 1.75
3141. Potash Bulb (A), for purifying oxygen before entering tube70
- 2320A. Calcium Chloride Tube (B), for drying the oxygen gas 1.40
- 3186B. Combustion Tube (D), of Opaque Fused Silica, glazed, 24 inches long and $\frac{3}{4}$ inch inside diameter 6.00
3143. Vanier Zinc Tube (E), to be filled with granulated zinc for removing sulphur and acid fumes 1.10
3144. Vanier Sulphuric Acid Tube (F), for absorbing moisture 1.90
124. Vanier Absorption Bulb (G), for carbon dioxide, a combined potash and drying tube, to be weighed for determining percentage of carbon in sample 10.50



No. 3150.



No. 3152.

3150. **COMBUSTION BOATS, of Alundum**, especially adapted for the determination of carbon in iron and steel. Since the alundum is not affected by iron oxide they may be used repeatedly. Furnished in fine mixture only. Thickness of wall, $\frac{1}{16}$ inch. With handle.
- | | | | | | |
|----------------------|----------------|----------------|----------------|----------------|----------------|
| No. | A | B | C | D | E |
| Length, inches | $3\frac{1}{2}$ | $3\frac{3}{4}$ | $4\frac{1}{2}$ | 5 | $5\frac{1}{2}$ |
| Width, inches | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{5}{8}$ | $\frac{3}{4}$ | $\frac{1}{2}$ |
| Depth, inches | $\frac{5}{16}$ | $\frac{3}{8}$ | $\frac{7}{16}$ | $\frac{7}{16}$ | $\frac{5}{16}$ |
| Each | .30 | .35 | .40 | .40 | .40 |
3152. **COMBUSTION BOATS, Porcelain**, glazed throughout, with ring handle.
- | | | | | | |
|------------------|-----|-----|-----|-----|-----|
| No. | A | B | C | D | E |
| Length, mm | 60 | 60 | 75 | 75 | 100 |
| Width, mm | 7 | 10 | 11 | 15 | 18 |
| Each | .22 | .22 | .24 | .26 | .28 |



No. 3162.



No. 3164.



No. 3166.

No. 3160.

3154. **COMBUSTION BOATS**, Johnson's, of vitrified clay, without handle. Thickness of wall, $\frac{1}{16}$ inch.

No.	A	B	C	D
Length, inches	4	4	4 $\frac{3}{4}$	5 $\frac{1}{4}$
Width, inches	5 $\frac{5}{8}$	3 $\frac{3}{4}$	5 $\frac{5}{8}$	3 $\frac{3}{4}$
Depth, inches	3 $\frac{3}{4}$	7 $\frac{1}{16}$	3 $\frac{3}{8}$	7 $\frac{1}{16}$
Each	\$0.13	.17	.16	.21

3156. **COMBUSTION BOATS**, Opaque Fused Silica, glazed on both sides, without handle.

No.	A	B	C
Length, inside, mm.	44	76	76
Width inside, mm.	13	13	16
Depth inside, mm.	8	8	10
Each	.63	.94	1.13

3158. **COMBUSTION BOATS**, Transparent Quartz, 8 mm wide by 5 mm deep. With ring handle.

No.	A	B	C
Length, mm.	50	65	75
Each	3.60	4.80	6.00

3160. **COMBUSTION BOAT LINING**, of R R Alundum, a very pure crystalline alumina treated to remove carbonaceous matter and surface alkali; used as a lining for boats of platinum, porcelain, clay and alundum to afford protection from fluxing during combustion. Supplied in glass stoppered bottles in Nos. 60, 90 and 120 mesh.

Please specify mesh in ordering.

Size bottle, pounds.	$\frac{1}{2}$	1	2
Each	.50	.85	1.50

3162. **COMBUSTION BOAT SHIELDS**, of Alundum, to protect combustion tubes from the spattering of overheated metals.

No.	A	B
Length, inches	4 $\frac{1}{2}$	5 $\frac{1}{2}$
Bore, inches	1 $\frac{1}{16}$	1 $\frac{3}{16}$
Diameter outside, inches	3 $\frac{3}{4}$	7 $\frac{1}{8}$
Each	.75	1.00

3164. **COMBUSTION CAPSULES**, of Alundum, for ashing coal, flour, etc. Will withstand high temperature and can be used repeatedly. Made in mixture RA 84.

No.	A	B	C	D
Diameter, inches	1 $\frac{1}{32}$	1 $\frac{7}{16}$	1 $\frac{5}{8}$	1 $\frac{3}{4}$
Height, inches	7 $\frac{1}{16}$	5 $\frac{5}{8}$	5 $\frac{5}{8}$	7 $\frac{1}{8}$
Capacity, cc.	7	10	18	25
Each	.25	.30	.40	.35

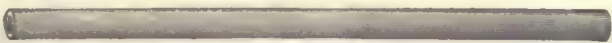
3166. **COMBUSTION CAPSULES**, of Best American Porcelain, without lip, as recommended for the determination of ash in coal or coke by the Joint Committee of the American Chemical Society and the American Society for Testing Materials. (See Journal of Industrial and Engineering Chemistry, January 1917).

No.	A	B
Diameter, inches	1 $\frac{3}{4}$	2
Depth, inches	7 $\frac{1}{8}$	1 $\frac{3}{16}$
Each	.20	.20

3170. **COMBUSTION CAPSULES**, of Opaque Fused Silica, for ash determinations and ignitions. Depth, $\frac{1}{2}$ inch.

No.	A	B	C	D
Diameter, inches	1 $\frac{3}{8}$	1 $\frac{3}{4}$	2	2 $\frac{3}{8}$
Capacity, cc.	10	15	20	35
Each	.75	.75	1.13	1.25

For other CAPSULES, see No. 2408.



No. 3182.



Nos. 3178, 79 and 80.

3178. **COMBUSTION TUBES**, Clay, Vitrified, C. M. Johnson's, for use in carbon determinations in iron and steel. (See Journal of Industrial & Engineering Chemistry, Vol. V, No. 7, for July 1913, page 581.)

No.	A	B
Length, inches	23½	27½
Diameter inside, inches.....	¾	15/16
Diameter outside, inches.....	1¼	1¼
Each	\$4.25	5.25

3179. **TAPERED CLAY CONNECTORS**, for Combustion Tubes No. 3178, without rubber sleeve.

For tube	A	B
Each	1.75	2.00

3180. **RUBBER SLEEVES** for use with Nos. 3178 and 3179.

For tube	A	B
Each	1.75	2.00

3182. **COMBUSTION TUBES**, of Best American Porcelain, glazed inside and outside, 60 cm long.

Thickness of wall, about 3 mm. Diameter inside, mm.....	15	18	25
Each	3.25	4.10	4.75

Note:—For special lengths add or subtract 1/100 of price for each cm of difference from stock lengths.

COMBUSTION TUBES, Opaque Fused Silica, melting point about 1500 degrees C.; unaffected by sudden changes in temperature. Length, 60 cm; thickness of wall, 2 mm.

No.	A	B	C
Diameter inside, mm.....	15	18	22
Each unglazed	4.38	5.25	5.75
Each glazed	5.63	6.00	7.00

3187. **COMBUSTION TUBES**, Pyrex Glass, for use in oxidation and reduction experiments, etc.

No.	A	B	C
Length, mm	200	300	450
Diameter inside, mm.....	5	10	19
Each .....	.16	.22	.60

3188. **COMBUSTION TUBES**, Pyrex Glass, 100 cm long. Thickness of wall, 2 to 3 mm.

Diameter inside, mm.....	12	18	20	25
Each .....	.90	1.50	1.80	2.00

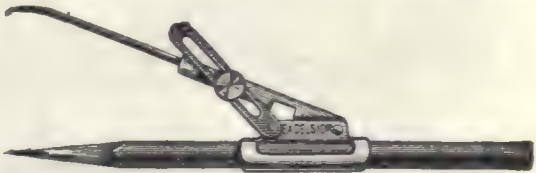
For **COMBUSTION TUBING** see No. 7206.

COMBUSTION TUBES, Transparent Quartz. These tubes can be furnished in any length and with wall of three different thicknesses: thin (0.5 mm), medium (0.75 mm) and heavy (1 mm). The prices given are per 10 cm of length.

Bore, mm	1	2	3	5	10	15	20	30	40	50
Per 10 cm, thin wall.....	.42	.60	.90	1.20	1.92	2.82	3.90	5.70	9.00	12.00
Per 10 cm, medium wall.....	.60	.90	1.20	1.80	2.88	4.20	5.70	8.52	13.50	18.00
Per 10 cm, heavy wall.....	.90	1.20	1.50	2.40	3.90	5.70	7.50	11.40	18.00	24.00



No. F521.



No. F523.

F521. **COMPASS**, Eagle Pencil. The most universally used school compass. Pen, pencil, divider and compass combined. Provided with set nut. Size 5½ inches over all. Complete with extra leads

Each .....	.30
Per dozen	3.00

F523. **COMPASS**, Pencil. Easily attached to a common pencil. Solid steel leg, durable and accurate. Without pencil

Each .....	.15
Per dozen	1.50



No. F2615.



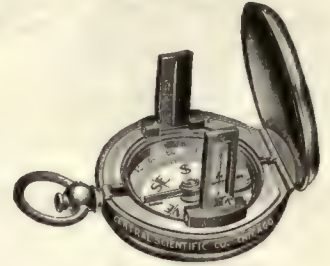
No. F2619.



No. F2621.



No. F2617.



No. F2625.

F2615. COMPASSES, MAGNETIC. Metal cap needle, brass case, card dial, beveled glass; the three larger sizes with ring.

Diameter, mm.....	10	16	25	40	50
Each	\$0.12	.20	.40	.65	.75

F2617. COMPASS, MAGNETIC. Agate cap needle, brass case, brass dial, 2° divisions, beveled glass, with cover.

Diameter, mm.....	40	50
Each	1.80	2.00

F2619. COMPASS, MAGNETIC. Agate cap needle. A low priced but high-grade compass, with dial of enameled card graduated in 5° divisions. The needle is of special steel, heavily magnetized. The case is brass, gunmetal finish, and has a diameter of 38 mm and a thickness of 16 mm. A heavy beveled glass serves as a cover, making the whole practically dust and water-tight \$0.70

F2621. COMPASS, MAGNETIC. Agate cap needle, 37 mm aluminum pointer and stop for needle. Brass case, raised metal dial with 2° divisions. Especially useful in building galvanoscopes, tangent galvanometers, etc. Diameter, 50 mm..... 2.50

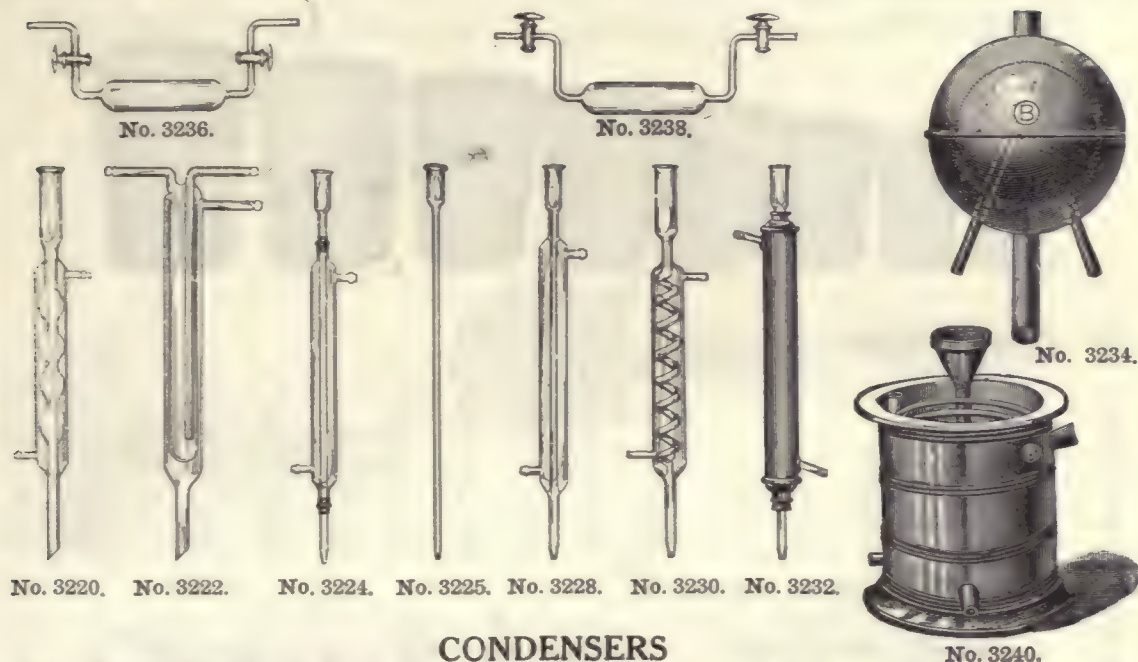
F2623. COMPASS, MAGNETIC. Agate cap needle, brass case, raised card dial with 2° divisions, beveled glass top. Diameter, 45 mm. Similar to No. F2621, but without pointer..... .90

F2625. COMPASS, SIGHT, watch case form, 50 mm diameter, with raised dial and full circle divisions. Bar needle 30 mm long, with agate cap. Sights and slip cover..... 11.50

COMPRESSION PUMPS, see Blowers; Pumps, Air.



Our Receiving Room, where New Goods are Inspected and Packed for Stock.



CONDENSERS

3220.	CONDENSERS, Allihn's, of glass with bulb condensing tube, with adapter sealed on.					
	Length of water jacket, inches.....	6	8	12	15	25
	Length over all, inches.....	12	14	19	22	33
	Each	\$1.10	1.30	1.80	2.00	3.00
3222.	CONDENSER, Hopkins Reflux, with inner jacket 25 cm long. Excellent for quick condensation, as the cold water jacket in the center offers a large condensing surface to the vapor. Length of outside jacket, 27½ cm; total length, 38 cm. (See Journal of the American Chemical Society, for December, 1908).....					
						3.30
3224.	CONDENSERS, Liebig's, of glass with rubber connections and adapter.					
	No.	A	B	C	D	E
	Length of water jacket, inches.....	10	12	15	20	25
	Length of condenser tube, inches.....	20	22	25	30	37
	Each	1.10	1.30	1.40	1.70	2.30
3225.	CONDENSER TUBES only for No. 3224, ½ inch in diameter.					
	Length, inches	20	22	25	30	37
	For condenser jacket, inches.....	10	12	15	20	25
	Each .....	.30	.33	.40	.45	.60
3228.	CONDENSERS, Liebig's, all of glass, with inner tube permanently sealed to jacket, with adapter.					
	Length of water jacket, inches.....	10	12	15	20	25
	Length over all, inches.....	17	19	22	28	33
	Each	1.40	1.60	1.90	2.50	3.50
3230.	CONDENSERS, Liebig's, of glass, with coiled condenser tube sealed in water jacket, with adapter sealed on.					
	Length of water jacket, inches.....		8	12	15	25
	Length over all, inches.....		14	19	22	33
	Each		2.00	2.60	3.25	6.00
3232.	CONDENSERS, Liebig's, of polished brass, 1½ inches in diameter, fitted with glass condensing tube and rubber connections.					
	Length of brass jacket, inches.....			15	20	30
	Length over all, inches.....			25	30	42
	Each			3.90	4.50	6.00
3234.	CONDENSER, Soxhlet's Spherical, of copper, tinned inside and nickel-plated; diameter, 4 inches					
						3.60
3236.	CONDENSER, Sulphurous Acid, Fischer's, with two glass stop-cocks on vertical tubes.....					
						3.75
3238.	CONDENSER, Sulphurous Acid, Liebig's, with two glass stop-cocks on horizontal tubes....					
						3.75
3240.	CONDENSERS, Zinc, with heavy block tin worm, for use with Distilling Apparatus No. 4148.					
	No.	A	B	C	D	E
	For still, capacity, gallons.....	½	1	2	3	5
	Height over all, inches.....	6¾	7	10¼	14¾	15¾
	Diameter outside, inches.....	5¾	7	8¼	9¼	12¾
	Diameter of tin tube, inches.....	¾	¾	¾	¾	¾
	Each	5.50	7.00	8.75	11.50	15.00
3242.	CORD, Chalk Line, Masons', ¼ inch; in hanks of 20 feet.....					
					Per hank	.08
3244.	CORD, Fish Line, Silk, braided, 25 yards on card					
					Per card	.35
3245.	CORD, Twisted Flax, fine quality, in ½-lb. balls					
					Per ball	.80



Nos. 3246-56.

3246. CORKS, XX Quality, regular length.

No.	0	1	2	3	4	5	6	7	8	9	10
Diam. at small end, inches..	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{13}{32}$	$\frac{15}{32}$	$\frac{17}{32}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{25}{32}$
Per dozen	\$0.05	.05	.06	.07	.08	.09	.10	.11	.13	.15	.17
Per gross	.30	.30	.35	.40	.45	.50	.55	.60	.70	.90	1.00
No.	11	12	13	14	15	16	18	20	22	24	26
Diam. at small end, inches..	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$\frac{11}{16}$	$\frac{13}{32}$	$\frac{17}{32}$	$\frac{11}{32}$	$\frac{113}{32}$	$\frac{115}{32}$	$\frac{117}{32}$
Per dozen	.19	.20	.22	.25	.30	.40	.45	.50	.60	.75	.85
Per gross	1.05	1.15	1.25	1.45	1.65	2.00	2.35	2.85	3.45	4.20	5.10

3248. CORKS, XX Quality, short taper.

No.	1	2	3	4	5	6	7	8
Diam. at small end, inches.....	11/32	13/32	15/32	17/32	9/16	5/8	11/16	3/4
Per dozen .....	.05	.05	.06	.07	.08	.09	.10	.13
Per gross .....	.30	.30	.35	.40	.45	.50	.60	.75
No.	9	10	11	12	13	14		
Diam. at small end, inches.....	25/32	13/16	7/8	15/16	1	1 1/16		
Per dozen .....	.15	.17	.19	.21	.21	.24		
Per gross .....	.85	.90	1.10	1.15	1.25	1.40		
No.	15	16	18	20	22	24	26	
Diam. at small end, inches.....	1 1/8	1 3/16	1 5/16	1 7/16	1 1/2	1 9/16	1 5/8	
Per dozen .....	.27	.30	.35	.40	.45	.55	.65	
Per gross	1.60	1.75	2.00	2.25	2.75	3.25	3.75	

3250. CORKS, XXXX Quality, regular length, far superior for laboratory work to the XX or XXX quality in soundness and freedom from holes.

No.	0	1	2	3	4	5	6	7	8	9	10
Diam. at small end, inches..	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{13}{32}$	$\frac{15}{32}$	$\frac{17}{32}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{25}{32}$
Per dozen	.08	.08	.09	.10	.11	.13	.15	.18	.22	.27	.30
Per gross	.45	.45	.50	.55	.65	.75	.85	1.00	1.25	1.60	1.80
No.	11	12	13	14	15	16	18	20	22	24	26
Diam. at small end, inches..	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1	$\frac{11}{16}$	$\frac{13}{32}$	$\frac{17}{32}$	$\frac{11}{32}$	$\frac{113}{32}$	$\frac{115}{32}$	$\frac{117}{32}$
Per dozen	.35	.38	.40	.45	.55	.65	.75	.90	1.15	1.40	1.70
Per gross	2.00	2.10	2.30	2.70	3.05	3.80	4.50	5.10	6.80	8.40	10.00

3252. CORKS, XX Quality, Nos. 0 to 11 assorted, in gross packages only.....Per gross .75

3253. CORKS, XX Quality, Nos. 12 to 26 assorted, in gross packages only.....Per gross 3.00

3256. CORKS, Selected Grade, regular length, finest quality, for use in chemical laboratories. An especially light cork, practically free from holes, specially recommended for use in laboratories where distillations and extractions are made with volatile liquids.

No.	0	1	2	3	4	5		
Diam. at small end, inches.....	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{13}{32}$	$\frac{15}{32}$	$\frac{17}{32}$		
Per hundred .....	.45	.45	.55	.65	.80	1.00	
Per bag of 500.....	2.00	2.00	2.50	3.00	3.60	4.50		
No.	6	7	8	9	10	11	12	
Diam. at small end, inches.....	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{25}{32}$	$\frac{13}{16}$	$\frac{7}{8}$	
Per hundred	1.10	1.35	1.60	2.00	2.25	2.35	2.50	
Per bag of 500.....	5.00	6.00	7.20	9.00	10.15	10.75	11.25	
No.	13	14	15	16	17	18	19	20
Diam. at small end, inches.....	$\frac{15}{16}$	1	$\frac{11}{16}$	$\frac{13}{32}$	$\frac{15}{32}$	$\frac{17}{32}$	$\frac{19}{32}$	$\frac{111}{32}$
Per hundred	2.65	3.00	3.50	4.25	5.00	5.50	6.00	8.00
Per bag of 500.....	12.00	13.50	15.75	19.25	22.50	25.00	27.00	36.00



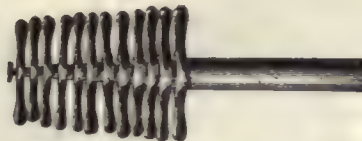
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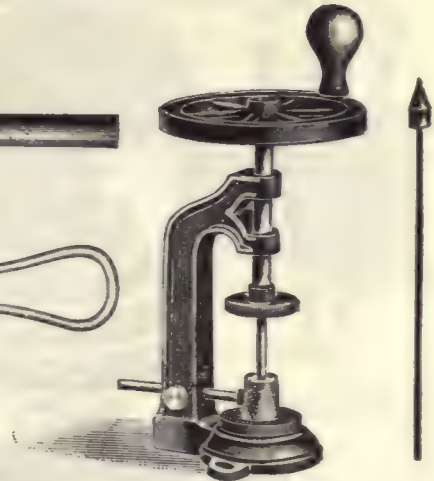
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No. 3274.



No. 3272.

3258. CORKS, Flat Specie Corks, XX Quality, with slight taper; for wide mouth bottles.

No.	A	B	C	D	E	F	G	H	J	K	L	M
Diam. at large end, in.	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$
Diam. at small end, in.	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2
Length, inches	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$
Per dozen	\$0.16	.16	.18	.20	.25	.30	.35	.45	.50	.55	.65	.75
Per gross	.95	.95	1.05	1.20	1.50	1.80	2.10	2.50	2.80	3.20	3.70	4.25

No.	N	P	Q	R	S	T	U	V	W	X	Y	Z
Diam. at large end, in.	$2\frac{1}{4}$	$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6
Diam. at small end, in.	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{1}{2}$	$4\frac{1}{8}$	$4\frac{7}{8}$	$5\frac{3}{4}$
Length, inches	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Per dozen	.80	.90	1.10	1.25	1.45	1.60	1.80	2.75	4.00	5.50	7.00	10.50
Per gross	4.75	5.30	6.40	7.25	8.30	9.30	10.30	16.50	24.50	32.50	41.00	65.00

3264. CORK BORER, hard brass, smallest size, $\frac{3}{16}$ inch, with punch.....\$0.40**3266. CORK BORERS, hard brass, in sets, with punch for each set.**

No.	A	B	C	D	E
Number in set	3	6	9	12	15
Diameter of borers, inches	$\frac{3}{16}$ - $\frac{5}{16}$	$\frac{3}{16}$ - $\frac{7}{16}$	$\frac{3}{16}$ - $\frac{5}{8}$	$\frac{3}{16}$ - $\frac{3}{4}$	$\frac{3}{16}$ - $\frac{7}{16}$
Per set	.60	1.20	2.00	3.00	4.40

3268. CORK BOREES, of hard brass in sets, with individual handles, and punch for each set.

No.	A	B	C	D	E
Number in set	3	6	9	12	15
Diameter of borers, inches	$\frac{3}{16}$ - $\frac{5}{16}$	$\frac{3}{16}$ - $\frac{7}{16}$	$\frac{3}{16}$ - $\frac{5}{8}$	$\frac{3}{16}$ - $\frac{3}{4}$	$\frac{3}{16}$ - $\frac{7}{8}$
Per set	1.05	2.00	3.50	5.20	7.50

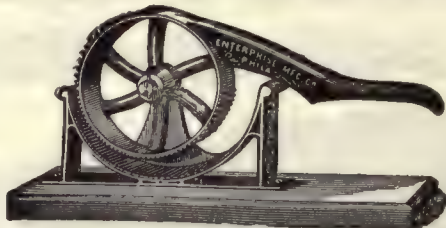
3270. CORK BORERS, of steel tubing, in sets, with individual handles, and punch for each set. Borers differ by $\frac{1}{16}$ inch in diameter.

No.	A	B	C
Number in set	3	6	8
Diameter of borers, inches	$\frac{1}{8}$ - $\frac{1}{4}$	$\frac{1}{8}$ - $\frac{7}{16}$	$\frac{1}{8}$ - $\frac{9}{16}$
Per set	1.25	2.50	3.50

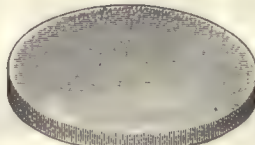
3272. CORK BORING MACHINE. Can be screwed firmly to table. With this machine it is possible to drill rapidly both rubber and cork stoppers. Complete with 8 interchangeable steel drills of from $\frac{3}{16}$ to $\frac{5}{8}$ inch diameter..... 15.00**3274. CORK BORER SHARPENER, steel cone with knife 1.75****3278. CORK EXTRACTOR, folding form.** Can be used in place of corkscrew. Especially valuable when corks have been pushed inside bottle..... .20



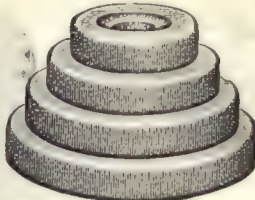
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No. 3292.



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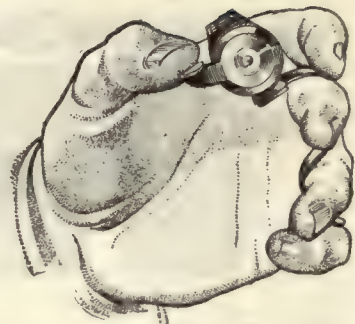
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No. 3304.



No. 3306.



No. 3318.



No. 3320.

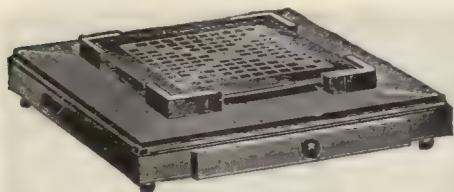


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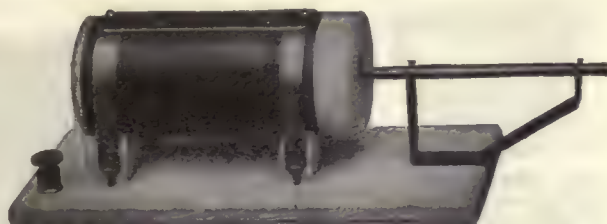
3280.	CORK GAGE, of aluminum, for use in determining the proper size of cork or rubber stoppers for bottles, flasks, etc. For rubber stoppers from 00 to 12 and cork stoppers from 1 to 26.....	\$0.10
8146.	CORK KNIFE, with good quality steel blade 4 inches long, and round wood handle.....	.25
3286.	CORK MATS, Suberite, of compressed cork, for supporting beakers, etc. Diameter, 12 cm.	
	Thickness, cm	1 2 4
	Each .....	.30 .36 .60
3292.	CORK PRESSES, rotary form.	
	No.	A B
	For corks up to, inches.....	3/4 1 1/4
	Each	1.00 1.30
3296.	CORK RINGS, Suberite, of compressed cork, for supporting flasks, etc. Highly recommended as a substitute for straw rings on account of their appearance and durability.	
	Diameter inside, mm.....	30 60 90 120 150
	Each .....	.28 .56 .80 .95 1.40
3298.	CORK SHEET, of compressed cork faced on both sides with white glazed paper. Designed especially for mounting insects in entomological work. Size of sheets 18x24x1/4 inch.	
	Per sheet	1.00
3300.	CORK SHEETS, XX Quality, size 4x12 inches.	
	Thickness, inches.....	1/8 3/16 1/4
	Each .....	.20 .30 .40
	Per dozen.....	2.00 3.00 4.00
3304.	CORKSCREW, wood handle.....	.10
3306.	CORKSCREW, self-pulling.....	.50
3308.	CORKSCREWS, twisted wire.....	Per dozen .10

COUNTING APPARATUS

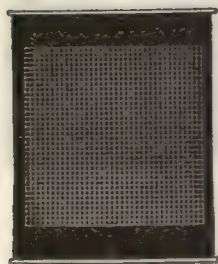
3318.	COUNTER, Hand Tally, for use in counting colonies of bacteria, and for other laboratory operations. Fits the fingers of the left hand as shown in the illustration. Registers up to 100,000.	2.25
3320.	COUNTING APPARATUS, Stewart, for counting colonies of bacteria. Consists of a hardwood box 12x8x6 inches, in which is placed a 16-candle power incandescent lamp and an adjustable support for carrying the Petri dish, illuminated by oblique rays from the lamp, which do not pass into the eyes of the operator. A ruled glass plate is provided on top of the box and the count is made by viewing the colonies on the Petri dish through the glass plate. (See Journal of Medical Research for January 1906).....	12.00
3321.	READING LENS for use with No. 3320.....	1.50
3322.	RULED COUNTING PLATE only of No. 3320.....	6.00



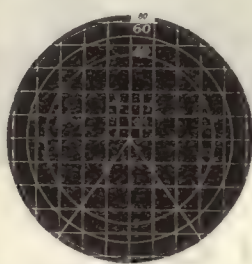
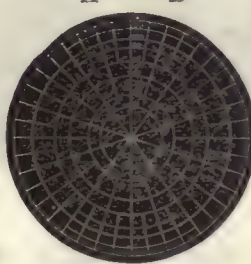
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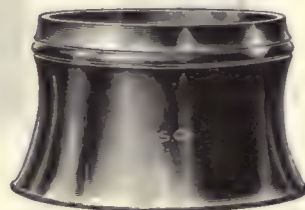
No. 3336.



No. 3340.

A B
No. 3328.

No. 3330.



No. 8344.

3324. **COUNTING APPARATUS**, Wolffhuegel's, for counting colonies of bacteria. Mounted on oak base with large drawer; furnished with background plates, black and white; surface of the plates is covered by rulings 12 cm square. \$8.50
3325. **RULED GLASS PLATE** only for No. 3324. 3.50
3328. **COUNTING PLATE**, Frost's, printed in black with white lines, on good quality Bristol board. The cross lines divide the figure into square centimeters. Four of these, just above the center, are subdivided. The numbers, 40, 60 and 80, give the area of the disks bounded by the circles just below them. The area of each sector, a and b, is one-tenth of the area enclosed by its circle.10
3330. **COUNTING PLATE**, Jeffer's, similar to No. 3328, but divided by concentric circles into equal areas, which are subdivided by radii or segments of radii into smaller integral portions. The numbers refer to the number of equal sections within the area enclosed by the circle just beneath the number. Within the sectors a and b the areas enclosed between the three outer circles are further subdivided into half-spaces. (See Journal of Applied Microscopy and Laboratory Methods, Vol. I, No. 3).10
8344. **MAGNIFIER** for use in counting colonies of bacteria, magnifying $2\frac{1}{2}$ diameters. Recommended for use by the American Public Health Association. (See Standard Methods of Bacteriological Analysis of Milk, for 1916, page 5). 1.00
3336. **CREMATOR**, DeKhotinsky Electrically Heated, for flaming platinum loops. In inoculating culture tubes or making sputum smears the spattering occasioned by flaming the platinum loop in the Bunsen burner flame is a source of great danger to the health of the operator. This trouble is entirely done away with in the DeKhotinsky Cremator, in which the flaming of the loops may be performed with perfect safety. The rapid flaming requires only a few moments and is complete, since the bright red heat to which the loop is subjected removes all carbonized material. The apparatus consists of a tube of heat resisting material 4 inches long by $\frac{3}{8}$ inch inside diameter, closed at one end and wound with Chromel wire. This tube is mounted in a neatly finished brass tube of $1\frac{1}{4}$ inches outside diameter, and the space between the two tubes is filled with magnesia-asbestos mixture. This tube is mounted on a base of asbestos board, fitted with binding posts for electrical connection and with a suitable support for the handle of the platinum loop. No. A B
For volts. 110 220
Each 10.00 11.00
3340. **CROSS SECTION CHART**, made of extra quality blackboard cloth, with lines in white, accurately spaced and permanent. Its surface takes crayon marks and permits their erasure as easily as a blackboard. Can be rolled up when not in use. Size of ruled surface, 36x36 in. 4.00
3344. **CROSS SECTION PAPER**, one millimeter divisions with heavy centimeter ruling. In sheets 17x17 cm on transparent onion skin paper. Per quire .30
3346. **CROSS SECTION PAPER**, accurately ruled, printed from an engraved plate. One millimeter divisions with heavier centimeter ruling; size 40x50 cm. Per sheet .20
Per quire 4.00
3347. **CROSS SECTION PAPER**, same as No. 3346, continuous ruling in one millimeter divisions, 50 cm wide. Per yard .33
3350. **CROSS SECTION PAPER**, ruled in $\frac{1}{10}$ th inch divisions, size 16x21 inches. Per sheet .08
Per quire 1.50
3352. **CROSS SECTION TABLET**, containing 75 sheets of paper metrically ruled with heavy lines every cm and light lines every 2 mm, with note ruling and marginal line on opposite side.18
3354. **POLAR CO-ORDINATE PAPER**, printed from an engine divided plate, about 17 cm in diameter. Per quire .45



No. 3360.



Nos. 3368-70.



No. 3372.

CRUCIBLES, ALL KINDS

3360. **CRUCIBLES, Alundum**, for general laboratory use. These crucibles will stand any temperature available in the laboratory, and this with their high thermal conductivity, makes them valuable for coal analysis, drying materials, igniting filters, etc. Furnished in fine mixtures only.

No.	A	B	C	D	E
Capacity, cc.	10	20	25	30	40
Diameter, inches	1 $\frac{1}{16}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{5}{8}$	1 $\frac{7}{8}$
Height, inches	1 $\frac{3}{32}$	1 $\frac{3}{16}$	1 $\frac{1}{2}$	1 $\frac{5}{8}$	1 $\frac{5}{8}$
Each	\$0.25	.30	.35	.35	.35

3361. **COVERS, Alundum**, for No. 3360 Crucibles.

No.	B	E
For crucibles, cc.	20	40
Each	.30	.35

3364. **CRUCIBLE, Alundum**, specially designed for determining moisture in coal. Diameter, 2 $\frac{1}{8}$ inches; height, 1 $\frac{1}{4}$ inches; capacity, 80 cc. .35

3366. **CRUCIBLES, Alundum Filtering**, for rapid filtration; save 75 per cent. of the time usually required. Not affected by solutions of acids or alkalis and can readily be dried to constant weight. Recommended by Spencer for use in sugar analysis. Medium porosity carried in stock. Fine and coarse porosities can be supplied on short notice.

No.	A	B
Capacity, cc.	25	35
Diameter, inches	1 $\frac{3}{8}$	1 $\frac{5}{8}$
Height, inches	1 $\frac{1}{2}$	1 $\frac{11}{16}$
Each	.30	.35

3368. **CRUCIBLES, Alundum Melting**, highly refractory, and well adapted to experimental electric furnace work. They are not suited for use where slags are encountered on account of their absorbent nature. Furnished in fine mixtures only, except No. 3368D which is porous. Price of No. 3368C includes cover.

No.	A	B	C	D
Diameter, inches	1 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{3}{4}$	3
Height, inches	2	2 $\frac{5}{8}$	4 $\frac{3}{4}$	3 $\frac{5}{8}$
Each	.75	1.00	2.00	1.25

3370. **CRUCIBLE, Alundum Melting**, similar to No. 3368, but of composition especially adapted for work requiring an extremely refractory body. Platinum has been melted in this crucible. Diameter, 1 $\frac{3}{8}$ inches; height, 3 $\frac{1}{4}$ inches. 1.50

3372. **CRUCIBLES, Denver Fire Clay**, for assay work; without covers.

No.	A	B	C	D	E
Capacity, grams	5	10	15	20	30
Height, inches	2 $\frac{5}{8}$	3	3 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{7}{8}$
Diam. at top, inches	2 $\frac{5}{8}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$	3	3 $\frac{1}{2}$
Approx. number in original barrel	850	500	400	350	250
Per dozen	.60	.75	.85	.95	1.40
Per 100 in original barrel	3.40	4.60	5.25	5.75	8.50

3373. **COVERS** for No. 3372,

Per dozen	.45	.45	.45	.65	.75
Per hundred in original barrel	3.00	3.00	3.00	4.50	5.00



No. 3384.

No. 3386.
No. 3390.

No. 3394.



No. 3388.

3376. **CRUCIBLES, Denver Fire Clay, high form, for gasoline or open furnace work; without covers.**

No.	D	E	F	G	J	K	L
Height, inches	4	4½	5	5½	6½	7¼	8
Diam. at top, inches.....	2¼	3	3½	3¾	4¾	4¾	5¼
Approx. number in original barrel....	450	300	250	175	75	50	40
Per dozen	\$0.90	1.35	1.50	2.05	3.90	4.75	8.45
Per 100 in original barrel.....	5.25	7.95	8.90	12.30	23.40	28.45	50.50

3377. **COVERS for No. 3376.**

Per dozen .....	.40	.55	.60	.65	.90	1.40	1.60
Per hundred in original barrel.....	2.75	3.90	4.00	5.25	6.50	10.50	12.00

3380. **CRUCIBLES, Denver Fire Clay, tall narrow or French form; for gas or gasoline furnaces; without covers.**

No.	6	8	9
Height, inches	4	5	5¾
Diam. at top, inches.....	2¼	2½	3
Approx. number in original barrel.....	450	300	250
Per dozen .....	.90	1.65	2.10
Per 100 in original barrel.....	5.25	9.75	12.60

3381. **COVERS for No. 3380.**

Per dozen .....	.45	.45	.75
Per 100 in original barrel.....	3.00	3.00	6.00

3384. **CRUCIBLE, Clay Filtering, C. M. Johnson's, very strong, resisting pressure. Will produce clear filtrates and withstand the full heat of a Meker burner. Especially adapted for use in determining vanadium and chromium. Diameter, 1½ inches; capacity, 25 cc.....** 1.253386. **CRUCIBLES, Copper, spun and polished, with covers.**

No.	A	B	C	D	E
Capacity, cc.....	20	30	50	100	250
Diameter, inches.....	1½	1¾	1¾	2¾	3¼
Height, inches.....	1¾	1¾	2	2½	3¼
Each .....	.65	.75	.85	1.10	2.20

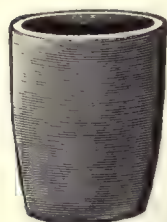
3388. **CRUCIBLES, Wrought Iron, light, with covers.**

Capacity, cc.....	20	50	100	200
Diameter, inches.....	1½	2½	2½	3¾
Height, inches.....	1¼	1½	2	2¾
Each .....	.20	.22	.35	.40

3390. **CRUCIBLES, Nickel, spun from pure sheet nickel, with covers.**

No.	A	B	C	D	E
Capacity, cc.....	20	30	50	100	250
Diameter, inches.....	1½	1¾	1¾	2¾	3¼
Height, inches.....	1¾	1¾	2	2½	3¼
Each	1.20	1.35	1.45	2.40	5.00

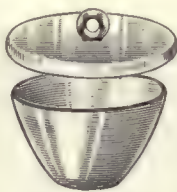
3392. **CRUCIBLE, Nickel, Kawin's, of heavy pure nickel, for use in muffle furnaces for burning off filter paper in silica determinations in iron. Diameter, 28 mm; height, 15 mm.....** .453394. **CRUCIBLE, Nickel, Pennock and Martin's, for the rapid and accurate determination of sulphur in coal and coke; consists of a pure nickel crucible of 40 cc capacity, with perforated lid for insertion of ignition wire, mounted upon an aluminum base. Diameter of crucible, 1½ inches; height, 1¾ inches. (See Journal of the American Chemical Society, for December 1903, page 1265)** 2.65



No. 3396.



Nos. 3400-1.



Nos. 3404-5.



No. 3408.



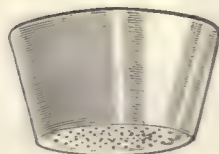
No. 3411.



No. 3412.

For **CRUCIBLES, Platinum**, see **Platinum Ware**.

3396.	CRUCIBLES, Plumbago or Black Lead, Dixon's, without covers.								
No.	0	00	000	0000	1	2	3		
Capacity about, fluid ounces.....	1½	2	3	4	8	12	16		
Height outside, inches.....	2	2¼	2½	3	3¾	4½	5¼		
Diam. at top, outside, inches.....	1½	1¾	2	2¾	3¼	3¾	4¼		
Each	\$0.65	.65	.65	.65	.80	.92	1.10		
No.	4	5	6	7	8	9	10		
Capacity about, pints.....	1½	1¾	2¼	2½	3	3½	4		
Height outside, inches.....	5¾	6	6¾	6¼	7¼	7½	7½ ¹⁰ / ₁₆		
Diam. at top, outside, inches.....	4¾	4¾	5¼	5½	5¾	6	6¼		
Each	1.45	1.67	1.95	2.14	2.43	2.70	3.00		
3397.	COVERS for No. 3396.								
To fit Crucible, No.....	0	00	000	0000	1	2	3		
Each .....	.30	.30	.30	.30	.42	.42	.42	
To fit Crucible, No.....	4	5	6	7	8	9	10		
Each .....	.42	.42	.50	.50	.50	.50	.50	
3400.	CRUCIBLES, Best American Porcelain, high form, glazed throughout, without covers.								
No.	000	00	0	1	2	3	4	5	
Capacity, cc.....	5	10	15	30	57	95	155	280	
Diameter at top, mm.....	26	30	35	41	52	62	72	87	
Height, mm.....	19	25	27	35	43	50	59	72	
Each .....	.09	.12	.15	.24	.30	.35	.45	.55
3401.	COVERS for Crucibles No. 3400.								
No.	000	00	0	1	2	3	4	5	
Diameter, mm.....	32	35	42	47	59	73	81	95	
Each .....	.05	.05	.05	.07	.09	.12	.12	.15
3404.	CRUCIBLES, Best American Porcelain, wide form, glazed throughout, without covers.								
No.	000	00	0	1	2	3	4	5	
Capacity, cc.....	8	12	17	30	50	90	145	265	
Diameter at top, mm.....	32	37	41	46	56	67	81	96	
Height, mm.....	19	21	25	29	36	44	52	65	
Each .....	.12	.15	.18	.25	.34	.43	.50	.62
3405.	COVERS for Crucibles No. 3404.								
No.	000	00	0	1	2	3	4	5	
Diameter, mm.....	39	44	47	52	65	76	88	107	
Each .....	.05	.05	.07	.07	.08	.12	.15	.18
3408.	CRUCIBLE, Caldwell's Form, Best American Porcelain, with removable perforated plate to fit in bottom. Size No. 3; capacity, 25 cc. Without cover.....								.55
3409.	COVER only for No. 3408.....								.07
3410.	PERFORATED DISK only for No. 3408.....								.20
	PERFORATED DISKS, Platinum, for No. 3408 Crucibles, see Platinum Ware.								
3411.	CRUCIBLE, Best American Porcelain, Cylindrical Shape, glazed throughout except on outside bottom surface. Diameter of rim, 30 mm; height, 32 mm; capacity, 15 cc.....								.25
3412.	CRUCIBLES, Gooch Form, Best American Porcelain, glazed throughout except outside bottom surface. Perforations about ½ mm in diameter. Without covers.								
No.					2	3	4		
Capacity, cc.....					10	25	35		
Diameter at top, mm.....					27	35	40		
Diameter at bottom, mm.....					18	22	25		
Height, mm.....					30	40	43		
Each .....					.30	.40	.45	
3413.	COVERS for No. 3412.								
Diameter, mm.....					35	42	47		
Each .....					.05	.05	.07	



No. 3414.



No. 3416.



Nos. 3428-9.

3414. **CRUCIBLE, Gooch, for Bitumen in Asphalt, Best American Porcelain, with large filtering surface.** Height, 24 mm; width at top, 45 mm; width at bottom, 35 mm..... \$0.50

3416. **CRUCIBLES, Rose's, of unglazed porcelain, complete with perforated cover and delivery tube.**

No.	1	2	3
Capacity, cc.....	15	30	60
Diameter at top, mm.....	30	35	50
Height, mm.....	38	40	50
Each .....	.50	.80	.90

3417. **COVERS only of No. 3416.**

No.	1	2	3
Diameter, mm.....	38	42	59
Each .....	.10	.15	.20

3418. **CRUCIBLES only of No. 3416.**

No.	1	2	3
Each .....	.20	.27	.30

3419. **DELIVERY TUBES only, with flange, of No. 3416.**

No.	1	2	3
Each .....	.25	.40	.50

3422. **CRUCIBLES, Transparent Quartz, of tall, narrow (so-called platinum) shape, without covers.**

No.	A	B	C	D	E	F	G	H
Capacity, cc.....	10	20	30	40	50	60	80	100
Diameter at top, mm..	28	35	40	45	50	54	58	65
Each	3.60	6.00	8.40	10.20	12.00	13.80	16.80	19.80

3424. **CRUCIBLES, Transparent Quartz, Gooch Form, same diameter as No. 3422 and with 7 holes 2 mm in diameter in the bottom. Without covers.**

No.	A	B	C	D	E	F	G	H
Capacity, cc.....	10	20	30	40	50	60	80	100
Each	5.40	9.00	12.60	15.30	18.00	20.70	25.50	29.70

3425. **CRUCIBLE COVERS, Transparent Quartz, for Nos. 3422 and 3424 Crucibles.**

For crucibles, No.....	A	B	C	D	E	F	G	H
Each	1.20	1.80	2.40	2.70	3.00	3.30	3.60	3.90

3426. **CRUCIBLE COVERS, Rose's, Transparent Quartz, for No. 3422 Crucibles, with delivery tube.**

For crucibles, No.....	A	B
Each	3.00	3.60

3428. **CRUCIBLES, Sand, Dixon's Assay, round form, without covers. Sizes same as Battersea.**

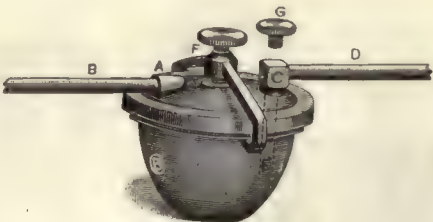
No.	A	B	C	D	E	F	G	H
Diameter outside, inches.....	1 $\frac{5}{8}$	1 $\frac{7}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{8}$	2 $\frac{7}{8}$	3	3 $\frac{3}{8}$	3 $\frac{5}{8}$
Height outside, inches.....	2 $\frac{5}{8}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{5}{8}$	5 $\frac{7}{8}$
Each .....	.10	.10	.10	.10	.15	.17	.20	.35
Per 100.....	5.50	6.50	7.00	8.00	12.00	13.00	17.00	30.00
No.	J	K	L	M	N	P	Q	R
Diameter outside, inches.....	4 $\frac{3}{8}$	4 $\frac{1}{2}$	5 $\frac{1}{4}$	5 $\frac{3}{8}$	6 $\frac{1}{2}$	7	7 $\frac{3}{8}$	8 $\frac{1}{4}$
Height outside, inches.....	6 $\frac{5}{8}$	7 $\frac{1}{4}$	8	8 $\frac{1}{2}$	9 $\frac{3}{8}$	10	11	12
Each .....	.50	.55	.75	1.00	1.25	1.80	2.50	4.00
Per 100.....	40.00	45.00	64.00	80.00	110.00	160.00	220.00	350.00

3429. **COVERS for No. 3428 Crucibles.**

No.	A	B	C	D	E	F	G	H
Each .....	.05	.06	.07	.07 $\frac{1}{2}$	.08	.10	.12	.14
Per 100.....	4.50	5.00	6.00	6.50	7.00	8.50	10.00	12.00
No.	J	K	L	M	N	P	Q	R
Each .....	.15	.20	.21	.22	.24	.26	.28	.30
Per 100.....	13.50	16.50	18.00	19.00	20.00	21.00	24.00	25.00



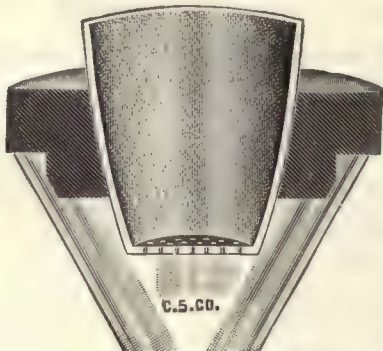
No. 3432.



No. 3440.



No. 3446.



No. 3448.



No. 3438.

3432. **CRUCIBLES, Opaque Fused Silica**, wide form, 99.8% SiO₂. May be subjected continuously to temperatures up to 1200°C., and for short periods to much higher temperatures. Not affected by rapid changes of temperature, nor by acids, except hydrofluoric, and above 400 degrees C., phosphoric.

No.	000	00	0	1	2	3
Diameter, inches	1 1/16	1 5/8	1 5/8	1 7/8	2 1/4	2 5/8
Height, inches	3/4	3/4	1	1 1/8	1 7/16	1 3/4
Capacity, cc.....	4	10	15	25	40	65
Each	\$0.63	.75	.75	.94	1.13	1.57

3433. **CRUCIBLE COVERS, Opaque Fused Silica**.

For crucible, No.....	000	00	0	1	2	3
Diameter, inches	1 3/8	1 3/4	2	2 1/4	2 3/8	2 3/4
Each .....	.63	.63	.63	.75	.94	1.13

3436. **CRUCIBLE, Opaque Fused Silica, Caldwell Form**, with flanged bottom for perforated platinum or porcelain disk. Diameter at top, 1 5/8 inches; height, 1 5/8 inches..... **1.88**

PERFORATED PORCELAIN DISK for No. 3436, see No. 5366.

3438. **CRUCIBLES, Silver**, spun from pure sheets, with cover.

No.	A	B	C	D	E	F
Capacity, cc.....	20	30	50	75	100	150
Diameter, inches	1 1/2	1 5/8	1 3/4	2	2 3/8	2 3/4
Height, inches	1 3/8	1 3/4	2	2 1/4	2 1/2	2 3/4
Approx. weight, grams.....	35	45	60	80	100	150
Each	3.75	4.80	6.30	8.40	10.80	15.75

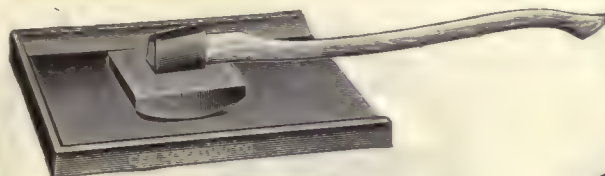
3440. **CRUCIBLES, Skidmore's Normal School Retort and Crucible**, spun of thin iron enabling it to be easily brought to a red heat in the flame of an ordinary burner. Can be used as an open or closed crucible, or retort. Specially adapted for use in making oxygen, in oxidation and reduction experiments, and in dry or steam distillations.

No.	A	B
Capacity, ounces.....	1 1/2	6
Each	1.05	1.65

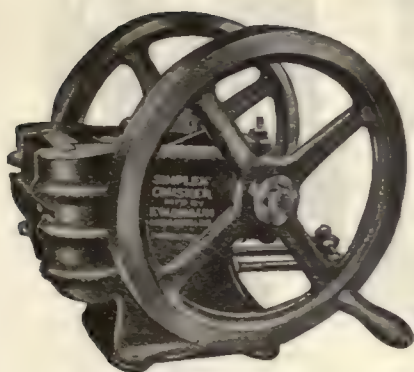
3446. **CRUCIBLE HOLDER** for use with any ordinary 60 degree funnel. Especially efficient, as the ring covers only about 1/8 inch of the upper rim of the crucible. Can be used with Gooch, Caldwell, Alundum or Johnson's Clay Crucibles. Made of one piece of soft rubber.

No.	A	B	C
For crucibles, top diameter, mm.....	27	35	40
Each .....	.30	.35	.40

3448. **CRUCIBLE HOLDER, Bailey's**, of rubber, to take No. 3 Gooch crucible. For use with a 2 inch funnel, as shown. Rubber holder only..... **.35**



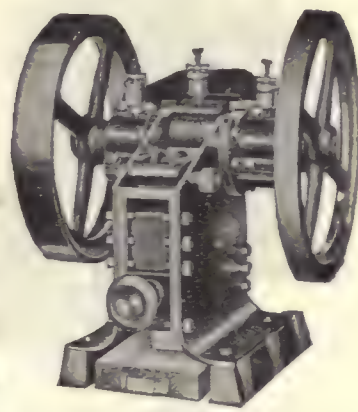
Nos. 3460-4.



No. 3468.



No. 3466.



No. 3474.

CRUSHING AND GRINDING APPARATUS

The crushers, grinders, mills and pulverizers listed in this section have been carefully selected to meet every requirement of the experimental and testing laboratory. They are all American made and have been in use for enough years under varied conditions to insure their serviceability and durability. In describing them, the attempt has been made in every case to state the particular uses for which they are best adapted, based on the experience of our trade.

We wish to direct especial attention to the Braun line of crushers, grinders and pulverizers, of which a complete line is carried in stock for immediate delivery.

3460. **CRUSHING PLATE, Bucking Board**, of chilled iron, with rim, for powdering ores, rock, etc. Complete with rubber of same material with set-in wooden handle.

No.	A	B
Size, inches	18x24	24x36
Weight, pounds	100	160
Each	\$10.00	17.50

3464. **CRUSHING PLATE, Bucking Board**, of hardest Chrome Steel, with rubber of same material 8x7 inches, weighing 30 pounds, with wooden handle. Faces of plate and rubber are machined. Metal does not grind off into sample. Recommended by the Chemist's Committee of the United States Steel Corporation. Size, 18x24 inches; weight, 120 pounds. (See Journal of Industrial & Engineering Chemistry, Vol. I, No. 2, for February, 1909)..... 110.00

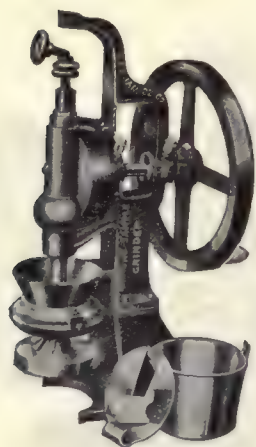
3466. **CRUSHER, Weatherhead's**, for hand operation, for crushing and pulverizing at one operation. Can be used for any material, from clay to pig iron. Cover of machine is designed for use as small hand mortar, using end of handle as pestle. Diameter of crusher, about 12 inches; height, about 8 inches; weight complete, 100 pounds 25.00

3468. **CRUSHER, Braun Simplex Ore**, for hand operation, for crushing small samples of ore. Fineness of the product can be easily controlled by turning two regulating screws provided with hand-wheels. The machine can be easily cleaned by removing with one blow of a hammer a wedge which holds the stationary jaw in place; the entire operation of opening and closing can be completed in one minute. Crushing plates are of hardest steel, and can be reversed or easily renewed when necessary. Capacity, 100 pounds of ore per hour reduced to $\frac{1}{4}$ inch and smaller. Height of machine over all, 18 inches; width, 15 $\frac{1}{2}$ inches; length, 20 inches; size of jaws, 6x3 inches; opening of jaws, 2 inches; diameter of wheels, 16 inches; shipping weight, 190 pounds. 40.00

3470. **CRUSHER, Simplex Ore**, same as No. 3468, but for power as well as hand operation. Power required, $\frac{1}{2}$ h. p.; speed, 200 revolutions per minute. Shipping weight, 197 pounds..... 45.00

3472. **CRUSHER, Simplex Ore**, same as No. 3468, but with tight and loose pulleys for power.... 57.00

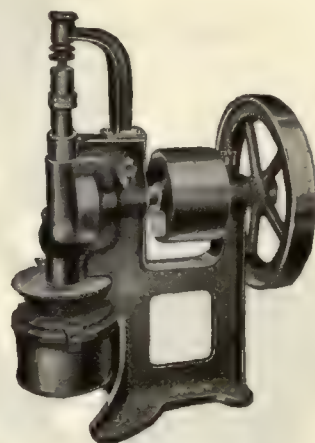
3474. **CRUSHER, Chipmunk, Improved Type VC**, for power, with all steel frames, rigidly secured together with strong studs. Bearings are of best phosphor-bronze which can be taken up when worn or easily renewed. The fineness of the product is readily controlled by the hand wheel in front. The stationary jaw lifts out permitting easy and thorough cleaning of interior. When operating, the vibratory jaw is given a forward and downward motion at lower end compelling the discharge of the crushed material. A special feature of this machine is its large capacity for the size of the jaws. Dimensions: length over all, 18 inches; height, 19 inches; width, 19 inches; size of jaws, 3x6 inches; opening of jaws, 2 $\frac{1}{4}$ x3 inches; dimensions of pulleys, 16x2 $\frac{1}{4}$ inches; speed, 400 revolutions per minute; power required to operate, 1 h. p.; capacity, 300 to 400 pounds per hour; shipping weight, 235 pounds 74.00



No. 3482.

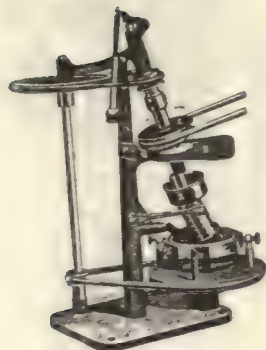


No. 3488.



No. 3492.

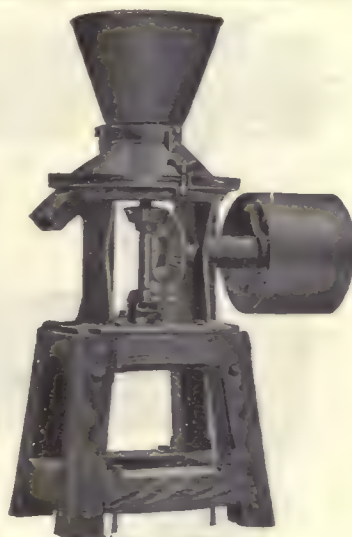
3476. **CRUSHER, Chipmunk Improved Type VC**, same as No. 3474, but with tight and loose pulleys for permanent connection to line shaft or motor. Shipping weight, 270 pounds..... \$85.00
3478. **CRUSHER, Chipmunk Improved Type WC**, of similar construction to No. 3474, but much larger. Dimensions: length over all, 22 inches; height, 26 inches; width, 22 inches; size of jaws, 9x4 inches; opening of jaws, 2 $\frac{3}{4}$ x4 inches; dimensions of pulleys, 20x3 inches; speed, 400 revolutions per minute; power required to operate, 2 h. p.; capacity, 1000 to 1500 pounds per hour; shipping weight, 460 pounds..... 132.00
3480. **CRUSHER, Chipmunk Improved Type WC**, same as No. 3478, but with tight and loose pulleys for permanent connection to line shaft or motor. Shipping weight, 515 pounds..... 149.00
- Prices on renewal parts for Simplex and Chipmunk Crushers quoted upon application.
3482. **GRINDERS, Braun Sample, for Rock, for hand operation.** A laboratory machine which will pulverize 4 ounces of hard quartz rock to 60 mesh in two minutes, or to 100 mesh in 3 minutes. All parts such as gears, are enclosed, making machines dust proof, eliminating danger, and preventing loss of any material. Bucket is readily removed and revolving plate lowered to facilitate cleaning. Dimensions: height over all, 31 inches; width, 21 inches; diameter of hand wheel, 16 inches; diameter of grinding plates, 6 inches; shipping weight, 180 pounds. Complete with one set of grinding plates 70.00
3483. **RENEWAL PLATES** for No. 3482.....per set 8.50
3486. **GRINDER, Braun Sample, for Coal and Coke, for hand operation.** Will pulverize 2 pounds of coal to 20 mesh in one minute, or 2 ounces to 80 mesh in five minutes; will reduce 2 pounds of coke to 20 mesh in 6 minutes, or 2 ounces to 80 mesh in 7 minutes. Shipping weight, 180 pounds. Complete with one set of grinding plates..... 75.00
- Note:**—This machine can be operated by power, using hand wheel as pulley. Power required, $\frac{1}{2}$ h. p.; speed, 200 revolutions per minute.
3488. **GRINDER, Braun Sample, for Coal and Coke, for power**, same as No. 3486, but fitted with tight and loose pulleys for permanent installation. Shipping weight, 190 pounds. Complete with one set of grinding plates 85.00
3489. **RENEWAL PLATES** for Nos. 3486 and 3488.....per set 8.50
3492. **GRINDER, Braun Sample, for Iron Ore, for power**, with special 7 inch carbon steel grinding plates, with low phosphorus content. A high speed machine for power only; will pulverize 1 pound of iron ore to 100 mesh in 1 $\frac{1}{2}$ minutes. Equipped with special bearings, heavy balance wheel and tight and loose pulleys. Dimensions: length over all, 24 inches; width, 16 inches; height, 31 inches; dimensions of pulleys, 7 $\frac{1}{2}$ x2 $\frac{1}{4}$ inches; speed of pulleys, 600 revolutions per minute; speed of grinding plates, 960 revolutions per minute; shipping weight, 290 pounds. Power required to operate, 1 h. p. Complete with one set of grinding plates..... 133.00
3493. **RENEWAL PLATES** for No. 3492, of carbon steel.....per set 23.00
3496. **GRINDER, Braun Sample, for Iron Ore, for power**, similar to No. 3492, but smaller and of lighter construction. Designed for intermittent use. Grinding plates, 6 inches in diameter, of special carbon steel, mounted vertically. Equipped with enclosed machine cut gears, and tight and loose pulleys, 12x2 inches. Dimensions: height over all, 31 inches; width, 24 inches; shipping weight, 190 pounds. Speed of pulleys, 500 r. p. m.; of grinding plates, 800 r. p. m. Power required to operate, 1 h. p. Complete with one set of grinding plates..... 95.00
3497. **RENEWAL PLATES** for No. 3496.....per set 20.50
- Note:**—Prices on renewal parts for any of the preceding Sample Grinders quoted upon application.



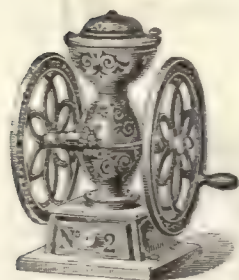
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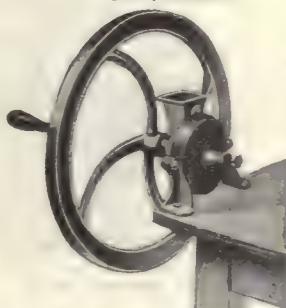
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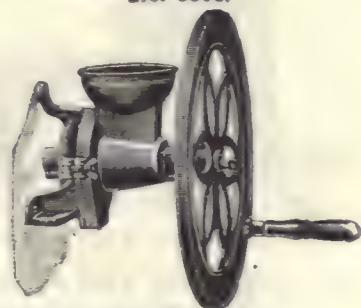
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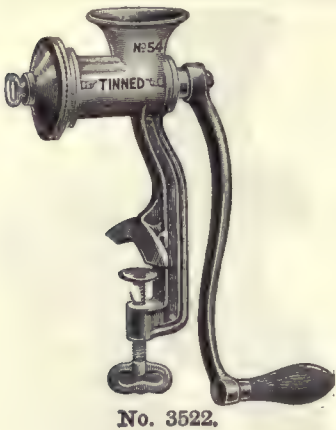


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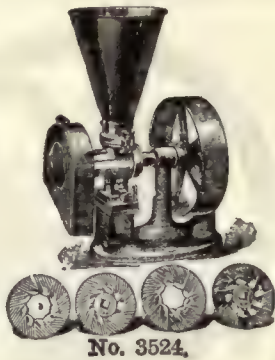


No. 3516.

3500. **GRINDER, Laboratory Ore, with Hardened Steel Mortar and Pestle, for power**, for reducing ore and rocks to an impalpable powder. The pestle is attached to a sliding rod held down by a spring at the top, so as to produce constant pressure on the mortar, which revolves slowly in the same direction as the pestle, producing a combined rolling and sliding motion similar to that in hand grinding. A scraper operates to keep the ore in the center of the mortar. By dropping one of the posts on the platform and raising the pestle, the mortar can be quickly removed. The machine is so constructed that no oil or foreign substance can contaminate the sample. Height of machine, 18 inches; diameter of mortar, $4\frac{1}{4}$ inches; power required to operate, $\frac{1}{4}$ h. p., at a speed of 250 r. p. m.; shipping weight, 40 pounds. (For complete description see Bulletin 422, of the United States Geological Survey, "The Analysis of Silicate and Carbonate Rock," by W. F. Hillebrand, page 55) **\$80.00**
3502. **GRINDER, Hance Conical Plate No. 1, for hand operation**, for grinding dry materials, such as drugs, grains, feed, coal, etc., to any degree of fineness down to 30 mesh. Grinder only for bolting to table, with 22-inch fly-wheel for hand power..... **50.00**
3504. **GRINDER, Hance Conical Plate No. 1, same as No. 3502, but equipped with 10x3 inch tight and loose pulleys for power**..... **50.00**
3508. **GRINDER, Hance Conical Plate No. 2, for power**, similar in construction to No. 3502, but much larger, with 14-inch grinding plates; mounted on substantial wooden support. Height over all, 48 inches; floor space, 18x31 inches; speed, 200 r. p. m.; power required to operate, 5 h. p.; size of pulleys, 12x4 inches; shipping weight, 385 pounds..... **125.00**
3510. **GRINDING MILLS, Laboratory and Drug, for hand operation**, for grinding herbs, roots, grains, feed and other dry substances.
- | | | | | |
|------------------------------|------------------|------------------|------------------|------------------|
| No. | 2 | 3 | 5 | 7 |
| Height, inches..... | 12 $\frac{1}{2}$ | 15 | 17 | 21 $\frac{1}{2}$ |
| Diam. of wheels, inches..... | 8 $\frac{3}{4}$ | 10 $\frac{3}{4}$ | 12 $\frac{1}{2}$ | 17 |
| Weight, pounds..... | 15 | 22 $\frac{1}{2}$ | 36 | 62 |
| Each | 6.30 | 9.40 | 13.70 | 18.80 |
3512. **GRINDING MILL, for hand operation**, for bolting to table or bench. For pulverizing hard substances for analysis, such as ores, bone, etc. Grinding surfaces are made of very hard material. Diameter of hand wheel, 19 $\frac{1}{2}$ inches; weight complete, 25 pounds..... **17.70**
3513. **EXTRA GRINDING PLATES for No. 3512**..... **per set 4.00**
3516. **GRINDING AND PULVERIZING MILL, for hand operation**, for soils, grains, dry bone, limestone, rock phosphate, etc. Compact, strong, and durable. Height, 11 inches; length, 12 inches; width, 9 inches; dimensions of throat, 3x2 inches; diameter of handwheel, 19 inches; weight complete, 47 $\frac{1}{2}$ pounds..... **10.00**



No. 3522.



No. 3524.



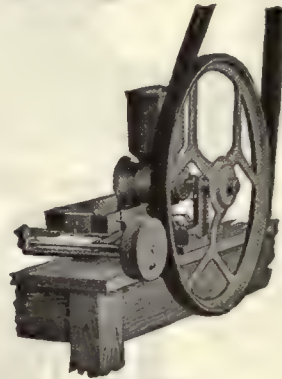
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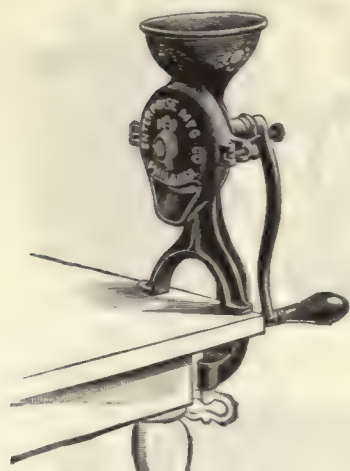
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No. 3536.

3518. **GRINDING AND PULVERIZING MILL**, for power, same as No. 3516, but fitted with single pulley, 12x3 inches..... \$15.00
3520. **GRINDING AND PULVERIZING MILL**, for power, same as No. 3516, but with tight and loose pulleys, 12x3 inches..... 20.00
3522. **GRINDING AND PULVERIZING MILL**, Nixtamal, for hand operation, for soils, herbs, grains, coal, dry bone, limestone, etc. Will pulverize limestone fine enough to pass through a 100 mesh sieve. Capacity (grain) 5 pounds per minute. Total weight, 24 pounds. Complete with three sets of grinding disks, coarse, medium and fine..... 17.50
3524. **GRINDING AND PULVERIZING MILL**, for power, similar to No. 3522 but larger, with hopper, and for power drive. Height, 24 inches; length, 12 inches; dimensions of pulley, 12x2 3/4 inches; speed of pulley, 300 r. p. m.; power required to operate, 2 to 3 h. p.; capacity per hour (cereals), 240 to 500 pounds; weight, 65 1/2 pounds..... 50.00
3526. **GRINDING AND PULVERIZING MILL**, for power, with automatic feed, adapted for grinding soils, coals, sand, gravel, stones, grit, cereals, etc. Will take large material and run either way, to right or left. The automatic feed is used for small material, while large pieces are fed directly into the mill. Height, 46 inches; height from floor to shaft, 24 inches; floor space, 23x30 inches; length over all, 36 inches; speed, 500 to 1000 r. p. m.; power required, 2 to 3 h. p.; dimensions of pulley, 8x4 inches; weight, 300 pounds; capacity per hour, 300 to 400 pounds 76.00
3528. **GRINDING AND PULVERIZING MILL**, for hand operation, specially designed for grinding small samples of wheat for flour analysis. Can also be used for coal, ore, grains, etc. Burrs are made of special hard steel alloy. Adjustable for different degrees of fineness. Parts can be easily taken apart for cleaning. For hand power, with crank handle of rolled steel, 9 inches in length. Shipping weight, 10 pounds 7.00
3530. **GRINDING AND PULVERIZING MILL**, for hand or power, same as No. 3528, but with hand-wheel, which can also be used for pulley. Flexible connection between hand-wheel and mill permits easy release of mill for thorough cleaning. Shipping weight, about 20 pounds 11.50
3532. **GRINDING AND PULVERIZING MILL**, for hand or power, same as No. 3530, but with a bolter which oscillates under outlet to separate ground material into two grades. With two interchangeable bolter boxes, each having a different grade of cloth. Shipping weight, about 25 pounds 21.50
3534. **GRINDING AND PULVERIZING MILL**, for power, same as No. 3532, but without handle, taking a 1 inch belt..... 21.50
3536. **GRINDING AND PULVERIZING MILLS**, for power, same as No. 3534, but mounted on pedestal base with motor, for bolting directly to floor. Can be connected to any incandescent lamp socket. Shipping weight, 75 pounds. Complete with two bolter boxes.

No.	A	B	C	D
	A.C.			
	D.C.			
For volts.....	110	220	110	220
Each	60.00	63.00	55.00	58.00
3537. EXTRA BOLTER BOXES for Nos. 3532, 3534, and 3536.....	each .80			



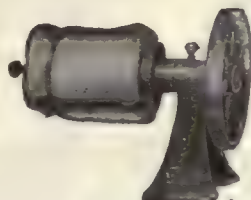
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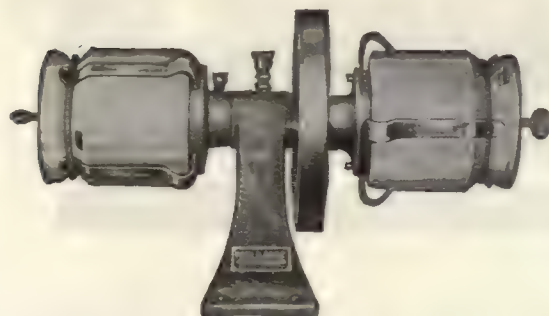
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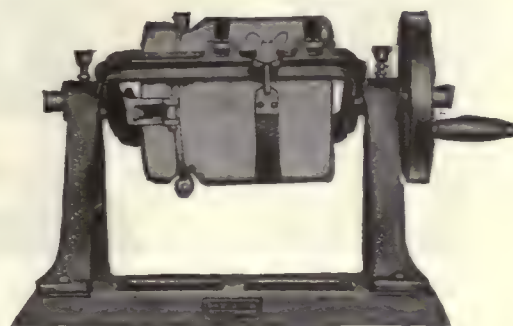
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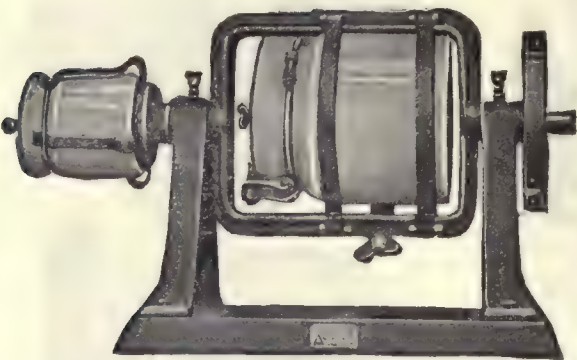


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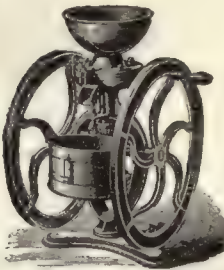


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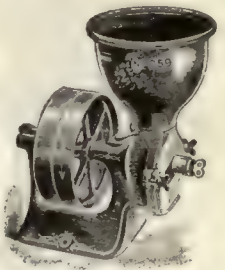
3540. **GRINDING MILL, Enterprise No. O, for hand power**, recommended by the Joint Rubber Insulation Committee, for grinding samples of rubber and insulating compounds for analysis. (See Journal of Industrial and Engineering Chemistry, Vol. IX, No. 3, for March 1917, page 313) \$2.50
3542. **MILL, Bagasse Cutter, for hand operation**, for cutting slices from bagasse and other fibrous material for analysis. The thickness of the slices can be controlled by a special regulating device from thinnest shavings to slices $\frac{1}{8}$ inch thick. With automatic feed..... 10.00
3544. **MILL, Single Specimen Ball, for power**, for pulverizing small samples of any material. Consisting of a porcelain jar with flint pebbles, mounted as shown with 9x1 inch pulley for power drive. Size of jar outside, 5.2x5.7 inches; floor space, 9x11 inches; speed, 80 to 120 r. p. m.; shipping weight, 50 pounds; capacity dry, $\frac{1}{4}$ ounce to 1 $\frac{1}{2}$ pounds at a charge; capacity wet, $\frac{1}{4}$ gallon 15.00
3546. **MILL, Double Specimen Ball**, same as No. 3544, but with two jars mounted to revolve on same axis. Floor space, 9x18 inches; shipping weight, 75 pounds..... 22.50
3547. **EXTRA PORCELAIN JARS** for Mills Nos. 3544 and 3546, size 5.2x5.7 inches; capacity, 1 quart each 5.00
3550. **MILL, Single Bacilli, for power**, with jars of special design for handling tubercle and other bacilli. Size of jar, 5.75x6.5 inches; size of pulley, 9x1 inch; floor space, 9x11 inches; speed, 80 to 120 r. p. m.; shipping weight, 65 pounds; capacity dry, $\frac{1}{4}$ ounce to 2 pounds at a charge; capacity wet, $\frac{1}{8}$ gallon..... 18.00
3552. **MILL, Double Bacilli**, same as No. 3550, but with two jars mounted to revolve on same axis. Floor space, 9x18 inches; shipping weight, 90 pounds 27.00
3554. **MILL, Single Assay, for hand or power**, for reducing to an impalpable powder any materials, either hard or soft, particularly those which must not come in contact with metals. Widely used in assay, cement, and soils laboratories. Size of jar, 8.75x9.65 inches; height of mill, 19 inches; floor space, 14x25 inches; size of pulleys, 9x1 inches; speed, 60 to 75 r. p. m.; shipping weight, 125 pounds; capacity dry, 1 ounce to 5 pounds at a charge; capacity wet, 1 gallon. With handle for hand operation..... 37.50



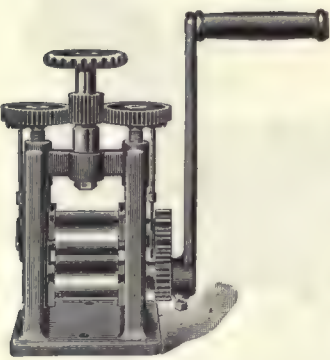
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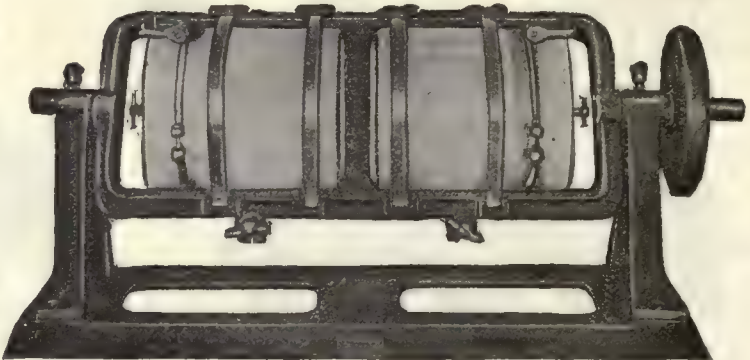
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No. 3564.



No. 3566.

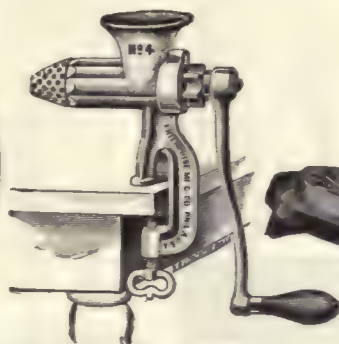


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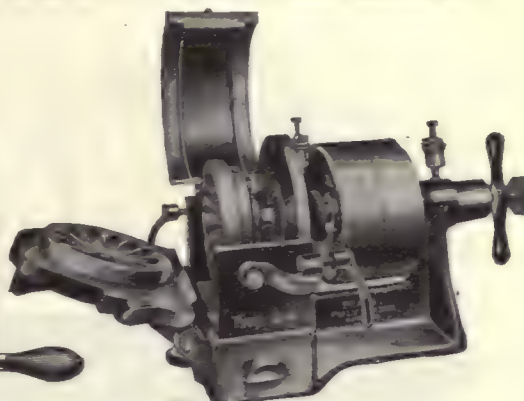
3556. **MILL, Single Assay, with Specimen Jar, for hand or power.** Size of assay jar, 8.75x9.65 inches; size of specimen jar, 5.2x5.7 inches; floor space, 14x35 inches; height, 19 inches; size of pulley, 9x1 inches; shipping weight, 140 pounds; speed, 60 to 75 r. p. m.; capacity of assay jar, dry, 1 ounce to 5 pounds; wet, 1 gallon; capacity of specimen jar, dry, 1/4 ounce to 1 1/2 pounds; wet, 1/4 gallon. With handle for hand operation..... \$48.75
3558. **MILL, Double Assay, for hand or power, same as No. 3554, with two porcelain jars, 8.75x9.65, mounted to revolve on same axis.** Floor space, 14x35 inches; shipping weight, 200 pounds. With pulley 9x1 inch for power, provided with handle for hand operation..... 67.50
3559. **EXTRA PORCELAIN JARS, 8.75x9.65 inches, with capacity of 1 gallon. For Mills Nos. 3554 to 3558**each 10.50
3560. **EXTRA PORCELAIN BALLS for Mills Nos. 3544 to 3558.**
- | | | | |
|------------------------|-----|-----|-----|
| Diameter, inches | 1/2 | 3/4 | 1 |
| Per pound | .60 | .60 | .50 |
3562. **MILL, Swift B Drug, for hand operation, easily adjusted to any degree of fine grinding; can be opened, cleaned and closed in 10 seconds without changing degree of fineness as adjusted.** Can be used for a variety of materials, such as feed, cereals, roots, herbs, soils, etc. Capacity of hopper, 3 pounds; floor space, 24x24 inches; height over all, 30 inches; diameter of grinders, 7 3/4 inches; diameter of fly-wheel, 34 inches; weight complete, 115 pounds..... 35.00
3564. **MILL, Grinding and Pulverizing, for power, with tight and loose pulleys.** Can be regulated to grind coarse or fine while running. Adapted for grinding leather samples, cotton seed, cereals, feed, etc. Height, 20 inches; length, 15 inches; speed, 250 r. p. m.; power to operate, 1/2 h. p.; capacity of hopper dry, 5 pounds; capacity of grinder, 1/2 pound per minute; shipping weight, 73 pounds 30.00
3566. **MILL, Rolling, Crown, for assay and dental laboratories.** Rolls are of crucible steel, ground and polished; pinions are cut from steel bar. Rolls can be easily removed from frame. Dimensions of rolls: diameter, 2 inches; length, 3 inches. Shipping weight, 54 pounds; dimensions of box, 18x11x8 inches..... 33.00
3568. **MILL, Rolling, Crown, same as No. 3566, but mounted on heavy iron column.** Dimensions over all, 49x17x17 inches; shipping weight, 150 pounds..... 41.00



No. 3570.



No. 3572.



No. 3578.



No. 3590.



No. 3592.



No. 3600.



No. 3602.

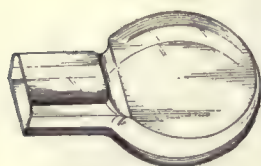


No. 3604.



No. 3608.

3570. **MILL, Sugar Cane**, for extracting the juice from cane or other plant materials. With 2 rolls, 4x4 inches; with single gearing for hand power. Capacity, 125 pounds of cane per hour... \$50.00
3572. **MILL, Beet Shredding**, with knives and plates of steel. External parts tinned to prevent rusting. Easily taken apart for cleaning. Capacity, 4 ounces per minute. Weight, 18 ounces.. 1.75
3578. **PULVERIZER, Braun, Type U. A.**, with tight and loose pulleys for power use. The grinding plates are made of special alloy possessing a high degree of wearing quality and durability. They are specially designed to secure best possible service, and can be easily replaced. The large and small lugs (shown in the illustration) act as breakers and carriers while the outer surfaces effect the pulverizing. The grinding plates are held in place in such a way that no screw heads or bolt heads protrude, and can be quickly and easily removed. The machine opens up so that every particle of material can be brushed into the pan. The interior is smooth finished with all parts easily accessible for cleaning. The pulverizer is fed through a spout in the door and will take particles up to $\frac{1}{4}$ mesh and reduce to 100 mesh at one grinding. Length of machine, 23 inches; width, 14 inches; height, 14 $\frac{1}{2}$ inches; size of pulleys, 9x2 $\frac{1}{2}$ inches; speed, 850 r. p. m.; power required to operate, 1 h. p.; shipping weight, 275 pounds; capacity (quartz ore), 1 pound to 100 mesh in 1 minute..... 108.00
3579. **EXTRA GRINDING PLATES** for Braun Pulverizer..... per set 8.50
For **SAMPLERS, RIFFLE PLATES**, etc., see **Sampling Apparatus**.
3590. **CULTURE DISHES, Petri Plates**, in pairs, of clear glass with thin flat bottoms, well annealed to withstand sterilizing.
- | No. | A | B | C | D | E | F | G |
|---------------------------------|-----|-----|-----|-----|-----|-----|-----|
| Diameter of upper dish, mm..... | 50 | 75 | 90 | 100 | 100 | 120 | 150 |
| Depth, mm..... | 10 | 10 | 10 | 10 | 15 | 20 | 20 |
| Per pair..... | .23 | .23 | .26 | .28 | .28 | .50 | .64 |
3592. **COVER, of Porous Earthenware**, for culture dishes 100 mm in diameter, to prevent spreading of growth by water of condensation during incubation20
3594. **COVER, of Porous Earthenware**, same as No. 3592, but glazed..... .25
3600. **CULTURE DISHES, Moist Chambers**, made of clear white glass, with cover.
- | No. | A | B |
|------------------------------|------|------|
| Diam. of upper dish, mm..... | 193 | 240 |
| Depth of lower dish, mm..... | 70 | 80 |
| Each..... | 2.25 | 2.50 |
3602. **CULTURE DISH HOLDERS, Ravenel**, of nickel-plated spring wire, to hold dishes 100 mm in diameter for incubation or sterilization.
- | No. | A | B |
|----------------------|-----|-----|
| To hold, dishes..... | 3 | 6 |
| Each..... | .50 | .60 |
3604. **CULTURE DISH HOLDER**, for 100 mm dishes, of polished copper, with inside tray for removing dishes. Size, 9 inches high by 4 $\frac{1}{2}$ inches in diameter 3.25
3605. **CULTURE DISH HOLDER**, same as No. 3604, but made of sheet iron..... 1.80
3608. **CULTURE DISH HOLDER**, for 100 mm dishes, round form, of polished copper, nickel-plated, with five shelves, door and handle. Size, 8x5 inches 9.00



No. 3616.



No. 3618.



No. 3620.



No. 3622.



No. 3638.



No. 3640.

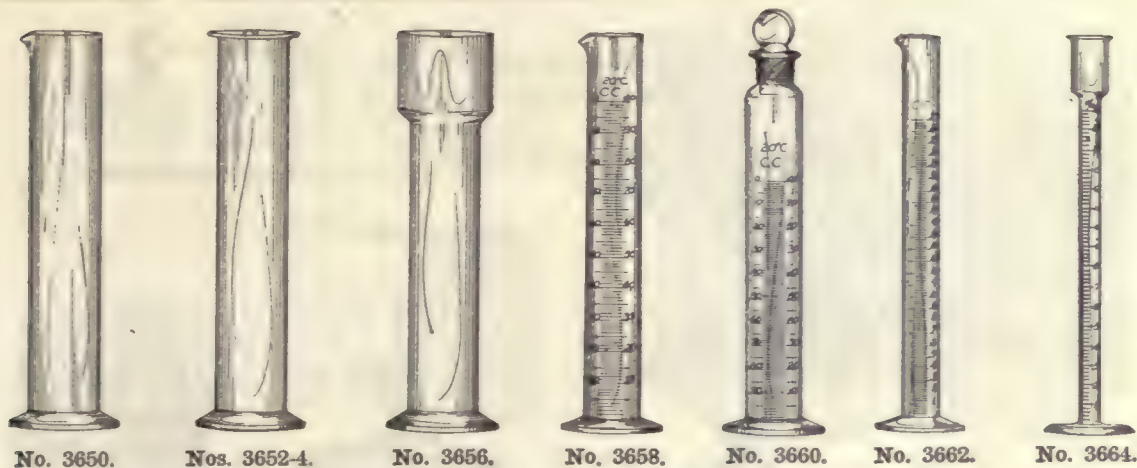


Nos. 3628-30.



No. 3644.

3616. **CULTURE FLASKS**, Kolle, of Pyrex glass, with neck indentation to prevent the culture medium from flowing out. Extensively used in the preparation of typhoid vaccine. Capacity, 320 cc; number in original case, 84.....each \$0.75
per dozen in original case 8.10
3618. **CULTURE FLASK**, Freudenreich's, with ground on cap. Capacity, 25 cc..... .55
3620. **CULTURE FLASK**, Freudenreich's, same as No. 3618, but with side tube..... .75
3622. **CULTURE FLASKS**, Miquel, with flat bottom and ground on cap.
Capacity, cc..... 50 75
Each 1.00 1.25
- CULTURE SLIDES**, see Microscope Accessories.
- CULTURE TUBES**, see No. 13358 Test Tubes.
3628. **CUPELS**, Bone Ash, highly absorbent.
Diameter, inches $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$
Per dozen45 .55 .60
Per 100 3 00 3.75 4.25
3630. **CUPELS**, Casite, extremely hard when cold, standing transportation without damage. When heated they become soft and as absorbent as the best bone ash.
Diameter, inches $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$
Per dozen25 .35 .40
Per 100 1.65 2.50 2.75
- CUPEL HOLDER**, see Blowpipe Apparatus.
3634. **CUPEL RAKE**, of iron, 24 inches long..... .60
3636. **CUPEL SHOVEL**, of iron, 24 inches long..... .60
3638. **CUPEL MOLDS**, of brass, finely finished.
Diameter, inches $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$
Each 1.75 2.00 2.25
3640. **CUPEL MOLDING MACHINE**, Her's, with foot pedal for securing pressures, leaving both hands free. Capacity, 500 cupels per hour. Shipping weight, 40 pounds. For both $1\frac{1}{4}$ and $1\frac{1}{2}$ inch cupels 30.00
3642. **CUPEL MOLDING MACHINE**, same as No. 3640, but equipped for making $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2 inch cupels 40.00
3644. **CUPEL TRAY**, of iron, with detachable handle, for 16 cupels..... 1.00
- CUPS**, Annealing, see Annealing Cups.
- CUPS**, Porous, for use with batteries, see Batteries.
- CUPS**, Swimming, see Swimming Cups.

**3650. CYLINDERS, Hydrometer Jars, of heavy glass, with lip.**

Size	B	C	D	E	F	G	H
Height, inches	6	8	10	12	15	15	18
Diameter, inches	1½	1½	1½	2	2	3	3
Each	\$.30	.36	.40	.50	.65	.95	1.50

3652. CYLINDERS, Hydrometer Jars, of heavy glass, with flange.

Size	B	C	D	E	F	G	H
Height, inches	6	8	10	12	15	15	18
Diameter, inches	1½	1½	1½	2	2	3	3
Each	.30	.36	.40	.50	.65	.95	1.50

3654. CYLINDERS, Hydrometer Jars, of heavy glass, with flange ground to take glass plate.

Size	B	C	D	E	F	G	H
Height, inches	6	8	10	12	15	15	18
Diameter, inches	1½	1½	1½	2	2	3	3
Each	.35	.40	.45	.55	.75	1.05	1.75

3656. CYLINDERS, Hydrometer Jars, with enlarged top to prevent overflow.

Size	A	B	C
Height, inches	12	14	16
Diameter of body, inches	1½	1¾	1¾
Each	.70	.80	.90

3658. CYLINDERS, Graduated, with double graduations to read up and down, with lip.

Capacity, cc.	5	10	25	50	100	200	250	500	1000	2000
Graduated in, cc.	¼	¼	⅓	½	1	2	2	5	10	10
Each	.35	.40	.50	.60	.70	1.00	1.10	1.50	2.00	4.00

3660. CYLINDERS, Graduated, Mixing Bottles, with glass stopper. With double graduations to read up and down.

Capacity, cc.	10	25	50	100	200	250	500	1000	2000
Graduated in, cc.	¼	⅓	½	1	2	2	5	10	10
Each	.70	.90	1.10	1.20	1.50	1.65	2.60	3.00	6.00

3662. CYLINDER, Graduated, for use with No. 7360 Brown-Duvel Moisture Tester. Graduated to 25 cc in 1½.

Each	.65
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3664. CYLINDER, Graduated, new design with enlarged top, for use with No. 7360 Brown-Duvel Moisture Tester. Reads directly in percentage of moisture up to 16 per cent., when 50 gram sample is used. (See Bulletin 56 of the United States Department of Agriculture).....

Each	.85
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CYLINDERS, Graduated, Precision or Normal, with single graduations, to meet the requirements of United States Bureau of Standards. With unofficial factory certificate.

3668. Each

Capacity, cc.	10	25	50	100	250	500	1000
Graduated in, cc.	¼	⅓	½	1	2	5	10
Each	1.50	2.30	2.60	2.30	3.40	3.75	5.30

3670. Each with Bureau of Standards Certificate.

Each	3.50	4.30	4.60	4.30	5.40	6.00	7.30
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CYLINDERS, Graduated, Mixing Bottles, Precision or Normal, glass stoppered, with single graduations, to meet the requirements of the United States Bureau of Standards. With unofficial factory certificate.

3672. Each

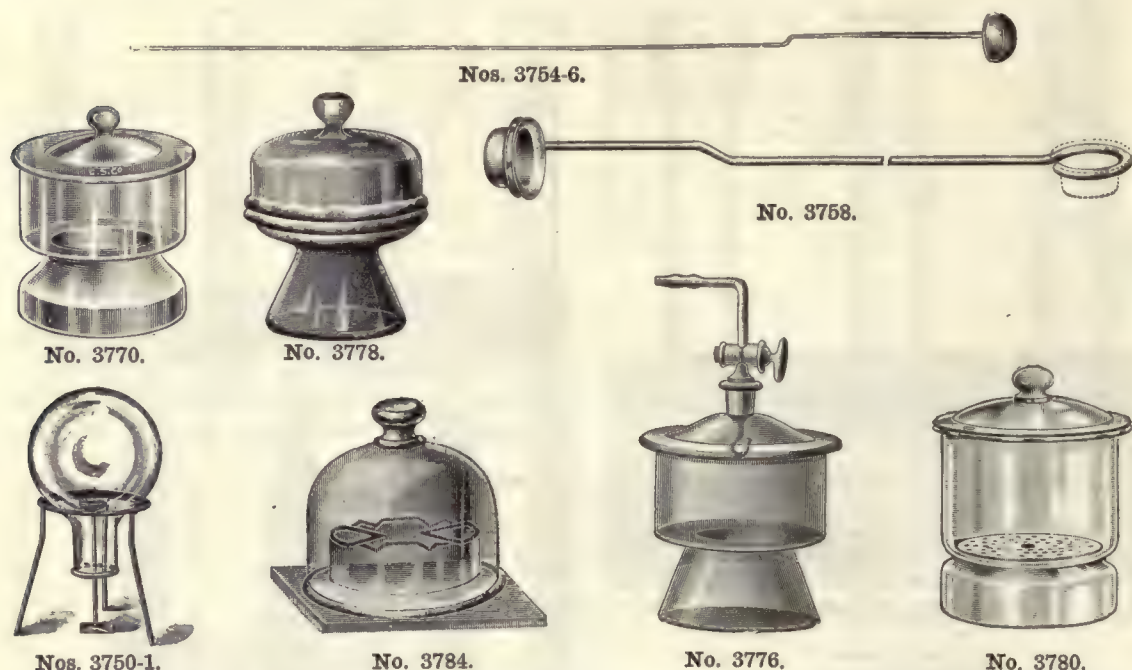
Capacity, cc.	10	25	50	100	250	500	1000
Graduated in, cc.	¼	⅓	½	1	2	5	10
Each	1.80	2.60	2.90	2.60	3.70	4.05	5.60

3674. Each with Bureau of Standards Certificate.

Each	3.80	4.60	4.90	4.60	5.70	6.75	7.60
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GRADUATES, Conical, etc., see Graduates.

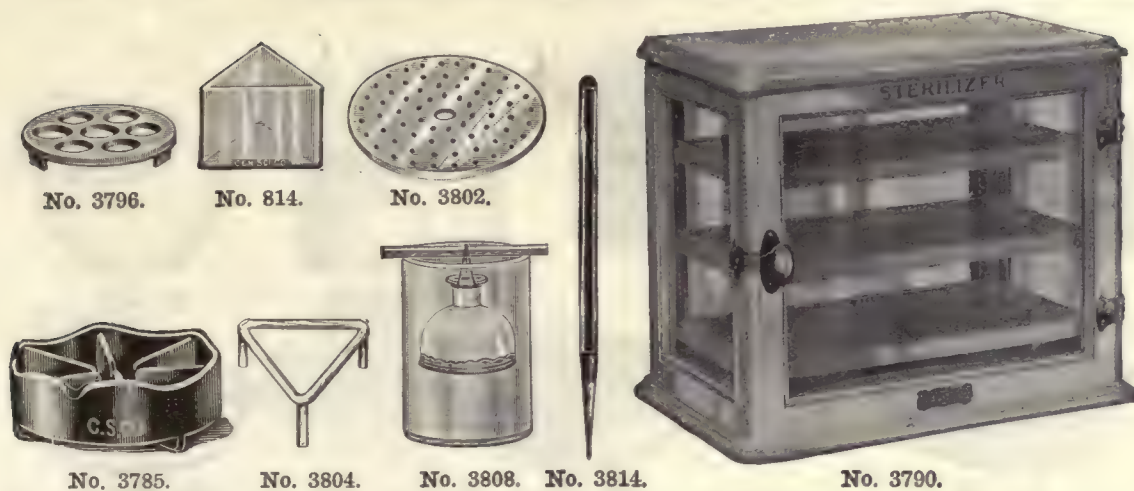
CYLINDERS, Urinometer, see Urinometers.



3750. **DEFLAGRATION GLOBE** for combustions in oxygen. Diameter of globe, 9 inches; diameter of opening, 2 inches. **Globe only**..... \$1.70
 3751. **SUPPORT and Cup** for No. 3750..... 1.30
 3754. **DEFLAGRATION SPOON**, of iron, with $\frac{3}{4}$ inch cup. Length over all, 15 inches..... .07
 3756. **DEFLAGRATION SPOON**, of brass, with $\frac{3}{4}$ inch cup. Length over all, 15 inches..... .10
 3758. **DEFLAGRATION AND COMBUSTION SPOON**, Parker's, with removable $\frac{3}{4}$ inch cup which can be placed at one end for combustion and at the other for use in deflagrations. Total length, about 15 inches..... .15
DEFLAGRATION Spoons for Sodium, see Spoons.

DESICCATORS

3770. **DESICCATORS**, Scheibler, with wide flanges and covers finely ground to fit.
 Diameter, inches 4 5 6 8 10
 Each 1.10 1.50 1.80 5.50 9.50
 3772. **DESICCATORS**, Scheibler, for vacuum, same as No. 3770, but with tubulature in cover to take rubber stopper.
 Diameter inside, inches..... 6 8 10
 Each 3.10 6.60 11.00
 3774. **DESICCATORS**, Scheibler, same as No. 3772, but complete with rubber stopper, glass stop-cock, and desiccator plate with 26 mm holes.
 Diameter inside, inches..... 6 8 10
 Each 6.50 10.50 16.00
 3776. **DESICCATORS**, Scheibler, same as No. 3772, but with glass stop-cock and hook ground in tubulature in cover.
 Diameter inside, inches..... 6 8 10
 Each 6.50 10.00 14.50
 3778. **DESICCATOR**, Atwater, with triangle. Diameter inside, about 4 inches..... 3.50
 3780. **DESICCATORS**, Fruehling and Schultz, with porcelain plate profusely perforated with small holes.
 Diameter inside, inches..... 8 10
 Each 10.00 14.00
 3782. **DESICCATORS**, Fruehling and Schultz, same as No. 3780, but with glass stop-cock and hook ground in cover.
 Diameter inside, inches..... 8 10
 Each 14.00 18.00
 3784. **DESICCATORS**, consisting of a bell jar ground to fit tightly upon a heavy glass plate. A porcelain dish is supplied for containing the drying agent, and for holding dishes and crucibles.
 No. A B
 Diameter of bell jar, cm..... 15 20
 Diameter of porcelain dish, cm..... 12 14.5
 Glass plate, cm square..... 20 25
 Each 3.25 4.70



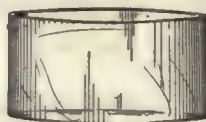
3785. **DESICCATOR DISHES, Acid Dishes only of No. 3784, of porcelain.**
 Diameter, cm..... 12 14.5
 Each \$0.80 1.10
814. **DESICCATOR, Triangular**, for use in corner of balance case; of glass, 2 inches on a side, 1½ inches high 1.00
3790. **DESICCATOR CABINET**, of glass, with wood frame carefully constructed to provide an airtight enclosure. Complete with three removable perforated steel trays. Finished in white enamel with nicked trimmings. Dimensions inside: length, 12¼ inches; height, 10¼ inches; depth, 7¾ inches 8.00
3794. **DESICCATOR PLATES**, of aluminum, with 7 holes, each 26 mm in diameter.
 Diameter, inches 4¾ 5½ 7½
 To fit desiccator, inches..... 5 6 8
 Each 1.25 1.25 1.80
3796. **DESICCATOR PLATES**, porcelain, glazed on one side, with three small feet and with holes 26 mm in diameter; intended for use in Scheibler Desiccators.
 No. 1 2 3 4 5
 Diameter, mm..... 95 115 140 190 240
 Diameter, approximate, inches..... 3¾ 4½ 5½ 7½ 9½
 Number of holes..... 3 4 5 6 8
 Each80 1.00 1.25 1.90 2.40
3798. **DESICCATOR PLATES**, glazed porcelain, with three small feet and with seven holes, each 26 mm in diameter.
 Diameter, inches 4¾ 5½
 Each 1.00 1.25
3800. **DESICCATOR PLATES**, glazed porcelain, without feet; with holes 30 mm in diameter.
 Diameter, mm..... 190 230
 Diameter, approximate, inches..... 7½ 9
 Number of holes..... 7 8
 Each 2.00 2.50
3802. **DESICCATOR PLATES**, glazed porcelain, profusely perforated with small holes.
 Diameter, mm..... 140 190 230
 Each 1.25 2.00 2.50
3804. **DESICCATOR TRIPODS**, of glass, with feet, to stand inside desiccators, for holding dishes and crucibles.
 No. A B C
 For desiccator, diameter, inches..... 4 5 6
 Each50 .60 .65
3808. **DIALYZER, Bell Glass Form**, consisting of open top bell glass, with large end covered with parchment paper, suspended in glass jar. Diameter of bell glass, 7.5 cm; size of glass jar, 5x7 inches 1.50
10040. **DIALYZER PAPER, Parchment**, of vegetable origin, medium thickness, in sheets 18x24 inches per sheet .05
 per quire .60
10042. **DIALYZER PAPER, Parchment**, genuine animal product in sheets 17x22 inches... per sheet 1.70
3814. **DIAMOND** for writing on glass, mounted in hard rubber handle..... 2.50
3815. **DIAMOND** for writing or etching on glass, with high grade, sharp diamond point, wooden handle and protecting cap..... 3.50
- DIAMOND GLASS CUTTERS**, see **Glass Cutters**.
3816. **DIAMOND INK** for writing on glass, in one ounce ceresine bottles..... .40
- DIGESTERS**, see **Autoclaves**.



No. 3820.



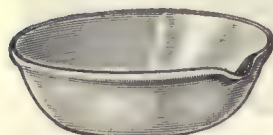
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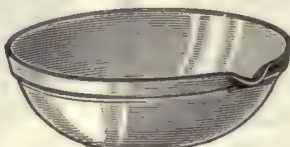
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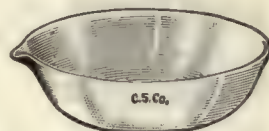
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No. 3832.



No. 3834.



No. 3836.

3820.	DIES, Figures, of steel, from 0 to 9, for stamping steel, bullion, etc.			
	Face, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$
	Per set	\$0.65	.90	1.50
3822.	DIES, Letters, of steel, complete set from A to Z, and period, for stamping steel, bullion, etc.			
	Face, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$
	Per set	2.00	2.70	4.50

DISHES, ALL KINDS

DISHES, Acid, see No. 3785.

DISHES, Aluminum, for milk analysis, see No. 3850.

3828.	DISHES, Crystallizing, of thin blown glass, with flat bottom, straight sides, and ground edges.						
No.	A	B	C	D	E	F	G
Approx. diameter, mm.	50	80	100	125	150	190	250
Approx. depth, mm.	35	40	50	65	75	95	125
Each .....	.12	.15	.20	.36	.48	.80	1.85

DISHES, Culture, see Culture Dishes.

3830. **DISHES, Evaporating, Resistance Glass,** flat bottom, heavy walled, with lip; may be used instead of porcelain.

No.	A	B	C	D
Diameter, mm.	60	80	105	125
Approximate capacity, cc.	50	100	200	400
Each .....	.18	.26	.40	.60

3832. **DISHES, Evaporating, Best American Porcelain,** highest quality, with lip, glazed inside and outside up to No. 5; larger sizes glazed inside, but only partly outside.

No.	000	00	0	1	2	3	4	5	6
Diameter, mm.	60	70	80	85	90	100	110	120	145
Approximate capacity, cc.	35	60	80	100	140	175	210	300	385
Each .....	.12	.18	.20	.30	.35	.40	.45	.55	.70
No.	6A	7	8	8A	9	10	11	12	13
Diameter, mm.	162	185	215	230	265	305	360	400	460
Approximate capacity, cc.	535	765	1285	1430	2200	3250	5700	10000	16500
Each .....	.80	.90	1.20	1.50	1.80	3.00	4.00	9.00	18.00

3834. **DISHES, Evaporating, Best American Porcelain,** glazed inside, but only partly outside, with heavy welted rim and lip. No. 12 13

Diameter, mm.	400	460
Approximate capacity, cc.	10000	16500
Each	12.00	20.00

3836. **DISHES, Evaporating, Best American Porcelain,** shallow form, with lip, glazed inside but only partly outside.

No.	1	2	3	4	5	6	7
Diameter, mm.	70	80	95	105	120	140	160
Height, mm.	15	20	23	30	34	40	48
Approximate capacity, cc.	45	60	95	160	200	350	550
Each .....	.20	.25	.40	.50	.60	.75	.90

3842. **DISHES, Evaporating, Opaque Fused Silica,** round bottom, glazed throughout, with lip. Not affected by sudden or extreme changes of temperature, nor by ordinary reagents.

No.	A	B	C	D	E	F
Diameter, mm.	51	70	82	89	98	108
Depth, mm.	21	25	30	22	30	44
Approximate capacity, cc.	25	45	80	90	100	200
Each	1.25	1.45	1.57	1.70	2.00	2.30



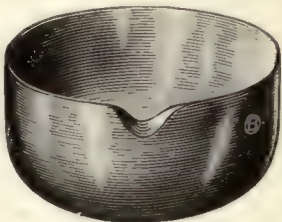
3843. **DISHES, Evaporating, Transparent Quartz, hemispherical, with lip.**
- | | | | | | | |
|--------------------|--------|------|------|-------|-------|-------|
| No. | A | B | C | D | E | F |
| Diameter, mm. | 30 | 50 | 60 | 75 | 100 | 125 |
| Capacity, cc. | 10 | 25 | 50 | 100 | 200 | 250 |
| Each | \$3.00 | 4.80 | 7.20 | 10.80 | 18.00 | 25.80 |
3844. **DISHES, Graniteware, flat bottom, with sloping sides.**
- | | | | |
|---|---------------|-----|-----|
| No. | A | B | C |
| Approx. diameter, cm. | 15 | 18 | 22 |
| Manufacturer's rated capacity, quarts. | $\frac{1}{2}$ | 1 | 2 |
| Each | .30 | .35 | .40 |
- DISHES, Iron, see Sand Baths.**
3846. **DISHES, Lead, for use with hydrofluoric acid in etching glass.**
- | | | | |
|--------------------|-----|-----|-----|
| Diameter, mm. | 50 | 75 | 100 |
| Each | .09 | .14 | .20 |
3848. **DISHES, Lead, Bottle Caps, for moisture in milk. Used also in the ether extraction of confectionery, according to the new method proposed by the Association of Official Agricultural Chemists. (See Journal of the Association of Official Agricultural Chemists, Vol. II, No. 1, Part II, page 73.)**
- | | | | |
|--------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| No. | A | B | C |
| Size, inches | $2\frac{3}{4} \times \frac{3}{4}$ | $2\frac{1}{2} \times 1\frac{1}{16}$ | $3\frac{1}{2} \times \frac{1}{2}$ |
| Per 100 | 2.50 | 2.50 | 2.50 |
3850. **DISHES, Milk, Aluminum, with straight sides and flat bottom.**
- | | | | | |
|--------------------|-----|-----|-----|-----|
| No. | A | B | C | D |
| Diameter, mm. | 50 | 65 | 75 | 100 |
| Depth, mm. | 12 | 15 | 20 | 25 |
| Each | .20 | .30 | .36 | .40 |
2408. **DISHES, Milk, Best American Porcelain, with straight sides and flat bottom, glazed inside and outside.**
- | | | | |
|----------------------------|-----|-----|-----|
| No. | 1 | 3 | 4 |
| Outside diameter, mm. | 45 | 69 | 72 |
| Depth, mm. | 12 | 13 | 16 |
| Capacity, cc. | 13 | 25 | 45 |
| Each | .25 | .35 | .40 |
1820. **DISHES, Moisture, Aluminum, with cover of same fitting outside. Cover can be fitted on bottom to keep parts together when dish is open. Extensively used in soil laboratories for determining moisture.**
- | | | | |
|--------------------|-----|-----|-----|
| No. | A | B | C |
| Diameter, mm. | 50 | 63 | 89 |
| Height, mm. | 22 | 44 | 50 |
| Each | .25 | .30 | .50 |
1821. **DISHES, Moisture, Aluminum, same as No. 1820, but with dish and cover numbered to agree. In ordering please state what numbers are desired.**
- | | | | |
|------------|-----|-----|-----|
| No. | A | B | C |
| Each | .30 | .35 | .55 |
3856. **DISH, Moisture, Aluminum, with flat bottom, sloping sides, and inverted cover fitting tightly on inside. Diameter at top, 55 mm; height, 15 mm** .50
3858. **DISHES, Nickel, spun from pure sheet, polished; round bottom, with lip.**
- | | | | | |
|--------------------|------|------|------|------|
| No. | A | B | C | D |
| Diameter, mm. | 50 | 70 | 89 | 100 |
| Capacity, cc. | 40 | 100 | 200 | 300 |
| Each | 1.10 | 1.45 | 2.20 | 3.00 |



No. 3860.



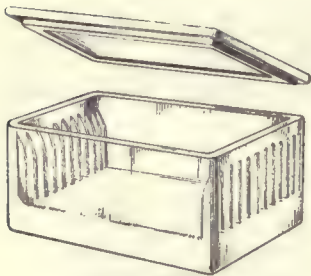
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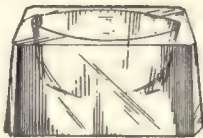
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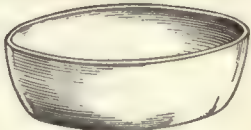
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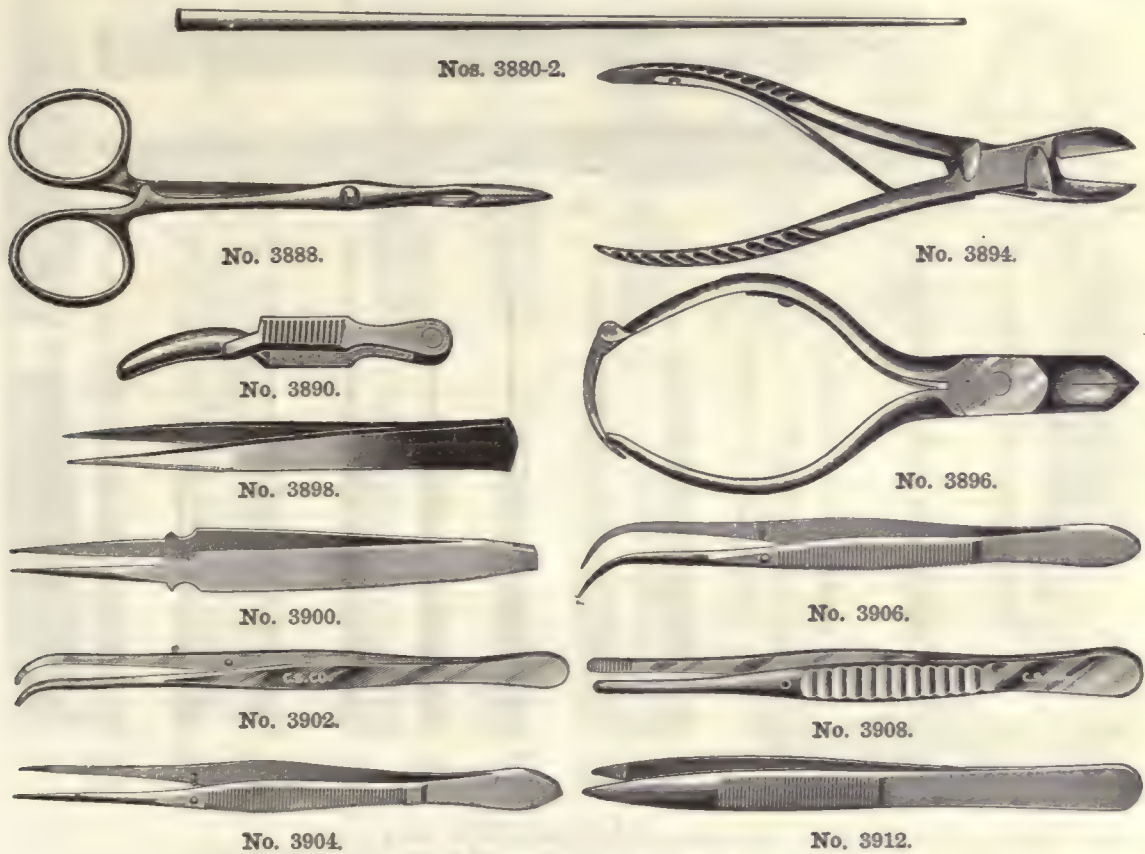
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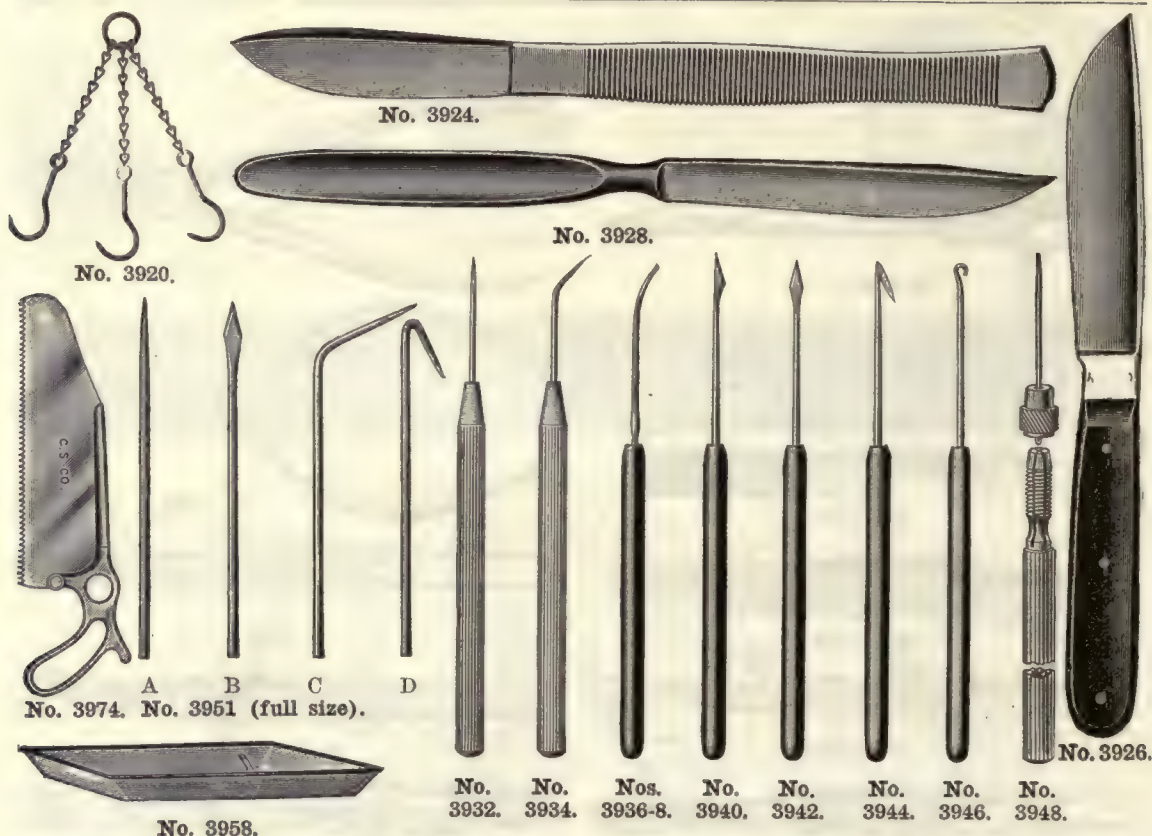
DISH, Nickel, Sugar, see No. 834.
DISHES, Platinum, see Platinum Ware.

3860.	DISHES, Preparation, of clear white glass, low form, with loose fitting cover.				
	No.	A			
	Diameter, mm.			50	
	Height, mm.			30	
	Each				\$0.35
3862.	DISHES, Preparation, Stender Dishes, with grooved covers ground to fit.				
	No.	A	B	C	D
	Diameter, mm.	36	50	60	60
	Height, mm.	19	25	28	89
	Each .....	.14	.18	.25	.25
3864.	DISHES, Roasting, Denver Fire Clay, very shallow.				
	Diameter, inches	3	4	5	6
	Each .....	.12	.15	.20	.30
	Per dozen	1.20	1.50	1.75	2.75
3866.	DISHES, Silver, spun from pure sheet, polished; round bottom with lip.				
	No.	A	B	C	D
	Diameter, mm.	50	70	89	100
	Capacity, cc.	40	100	200	300
	Weight about, grams.	45	75	125	175
	Each	4.75	8.90	13.10	18.40
3868.	DISH, Staining, of glass, with cover and grooves to hold ten 3 inch slides. Length outside, 3 5/8 inches; width outside, 2 5/8 inches. ....				.30
3870.	DISH, Staining, Embryological Cup, of solid glass with concavity in center, with one surface ground for writing. Dimensions 38x38x17 mm, with concavity 33 mm in diameter and 11 mm deep .....				.08
	DISHES, Staining, Syracuse Watch Glasses, see Watch Glasses.				
	STAINING JARS, see Jars, Staining.				
	DISHES, Stender, see Dishes, Preparation.				
3872.	DISH, Sugar, Opaque Fused Silica, flat bottom, without lip. Diameter, 51 mm; depth in center, 25 mm; approximate capacity, 40 cc.				1.56
3874.	DISH, Tannin, Opaque Fused Silica, flat bottom, without lip. Used also for ashing coal. Diameter, 82 mm; depth in center, 25 mm; approximate capacity, 75 cc.				1.56
	DISHES, Weighing, see Balance Weighing Scoops.				



DISSECTING INSTRUMENTS

3880.	BLOWPIPE for zoological work, nickel-plated, 125 mm long.....	\$0.12
3882.	BLOWPIPE for zoological work, nickel-plated, 188 mm long with very small orifice; especially suited for very small vessels.....	.25
3884.	BRISTLES, shoemaker's. Extra quality; useful as seekers for tracing out fine ducts and vessels.....	per 100 .20
3888.	FORCEPS, Artery, Dressing Forceps, of steel, nickel-plated, with corrugated jaws. Length, 115 mm.....	1.40
3890.	FORCEPS, Artery, Dieffenbach's, self-closing, of steel, nickel-plated, with corrugated curved jaws. Length, 60 mm.....	.85
3891.	FORCEPS, Artery, Dieffenbach's, same as No. 3890, but straight.....	.85
3894.	FORCEPS, Bone Cutting, of steel, nickel-plated, very heavy and strong. The blades fit accurately and are easily separable for cleaning.	
	Length, mm.....	200 225
	Each.....	4.00 4.50
3896.	FORCEPS, Bone Cutting, of steel, nickel-plated, with strong curved blades. Length, 125 mm.....	1.50
3898.	FORCEPS, Dissecting, Fine, of steel, nickel-plated, with smooth handles; fine, straight, smooth points. Length, 110 mm.....	.10
3900.	FORCEPS, Dissecting, Fine, of steel, nickel-plated, with smooth handles; fine straight, smooth points. Length, 95 mm.....	.25
3902.	FORCEPS, Dissecting, Fine, of steel, nickel-plated, with smooth handles; fine curved, file-cut points and guide pin. Length, 120 mm.....	.50
3904.	FORCEPS, Dissecting, Fine, of steel, nickel-plated, with corrugated handles; fine, straight, file-cut points, with guide pin. Length, 115 mm.....	.55
3906.	FORCEPS, Dissecting, Fine, of steel, nickel-plated, with corrugated handles; fine, curved, file-cut points, with guide pin. Length, 115 mm.....	.65
3908.	FORCEPS, Dissecting, Medium, of steel, nickel-plated, with corrugated handles; medium fine, straight, corrugated points, with guide pin. Length, 115 mm.....	.55
3910.	FORCEPS, Dissecting, Medium, same as No. 3908, but with curved points. Length, 110 mm.....	.60
3912.	FORCEPS, Dissecting, Heavy, of steel, nickel-plated, with corrugated handles; heavy, straight, corrugated points, with guide pin. Length, 115 mm.....	.50
3914.	FORCEPS, Dissecting, Heavy, of steel, nickel-plated, with corrugated handles; heavy, straight, file-cut corrugated points, without guide pin. Length, 125 mm.....	.50
	FORCEPS, Blowpipe, Cover Glass, Pinning, Weight, etc., see general heading, Forceps.	



3920. **HOOK AND CHAINS**, triple hooks, nickel-plated, with sharp points. \$0.30
3924. **KNIFE**, Cartilage, all steel, nickel-plated, corrugated handle; 50 mm cutting edge. Total length, 165 mm.80
3926. **KNIVES**, Cartilage, Heavy, Prosecting Knives, with heavy steel blade, extra thick at back, set in ebony handle. Length of cutting edge, mm. 70 90
Each90 1.00
3928. **KNIFE**, Cartilage, Large, all steel, with flat ground blade, 135 mm long. Suitable for cartilage work and large dissections. Total length, 250 mm. 3.75
3932. **NEEDLE**, Dissecting, of steel with plain wood handle 110 mm long; with straight sharp point. Length, 130 mm. per dozen .30
3934. **NEEDLE**, Dissecting, same as No. 3932, but with bent sharp point. per dozen .35
3936. **NEEDLE**, Dissecting, best quality, with curved sharp point.30
3938. **NEEDLE**, Dissecting, same as No. 3936, but with curved blunt point.30
3940. **NEEDLE**, Dissecting, same as No. 3936, but with half spear point.30
3942. **NEEDLE**, Dissecting, with full spear point, with double cutting edge.30
3944. **NEEDLE**, Dissecting, with harpoon shaped point, with two cutting edges.30
3946. **NEEDLE**, Dissecting, hook shaped.30
3948. **NEEDLE HOLDER**, of brass, nickel-plated, with screw chuck, with one straight needle. Length, 85 mm.15
3950. **NEEDLE HOLDER**, same as No. 3948, but with one bent needle.15
3951. **NEEDLES**, of steel, for use with Nos. 3948 and 3950 Holders. Length, 50 mm.
- | Style | A | B | C | D |
|-----------|----------|-------|------|------|
| Known as | straight | spear | bent | hook |
| Per dozen | .08 | .45 | .12 | .25 |
- OIL STONE** for sharpening Scalpels and Knives, see Nos. 9608 to 9612.
3958. **PAN**, Dissecting, of tinned metal, with metal loops at the bottom for fastening limbs of animals during dissection; size, 285x235x25 mm, unlined35
3959. **PAN**, Dissecting, same as No. 3958, lined with wax on bottom.55
3962. **PAN**, Dissecting, of heavy tinned metal, japanned, with metal loops for fastening limbs of animals during dissection. Dimensions, 290x190x30 mm deep.40
3963. **PAN**, Dissecting, same as No. 3962, but with bottom covered with black wax, to which small objects may be pinned.60
3966. **PAN**, Dissecting, of seamless agateware. Dimensions, 300x200x30 mm deep.35
3967. **PAN**, Dissecting, same as No. 3966, but with bottom covered with cork, to which small objects may be pinned.55
- RAZORS**, Section, see **Microtome Knives**.
3974. **SAW**, Bone, of steel, nickel-plated, parts separable for sterilization. Length of blade, 200 mm; total length, 300 mm. 3.30



SCALPELS

Scalpels are carried in three grades.

Grade C is made from a good grade of steel, carefully ground and sharpened. They are suitable for the ordinary elementary laboratory work of the student.

Grade B is made from carefully selected steel evenly honed. They are well finished, and can be used for the more advanced laboratory work by either student or instructor.

Grade A is made of the best English steel, tempered with the greatest care. The blades are hollow ground and finely honed. They will take and retain an edge such as is demanded for the most delicate dissections. They can be used in the most precise work in the private or research laboratory.

SCALPELS, REGULAR SHAPE

3980. SCALPELS, Grade C, with black wood handles.

No.	A	B	C
Length of cutting edge, mm.....	25	38	50
Each	\$0.40	.40	.45

3982. SCALPELS, Grade C, all steel, easily sterilized.

No.	A	B
Length of cutting edge, mm.....	25	38
Each .....	.45	.45

3984. SCALPELS, Grade B, with ebony handles.

No.	A	B	C	D
Length of cutting edge, mm.....	25	32	38	45
Each .....	.50	.50	.50	.50

3988. SCALPELS, Grade A, with ebony handles.

No.	A	B	C	D	E
Length of cutting edge, mm.....	25	32	38	45	50
Each .....	.65	.65	.65	.65	.70

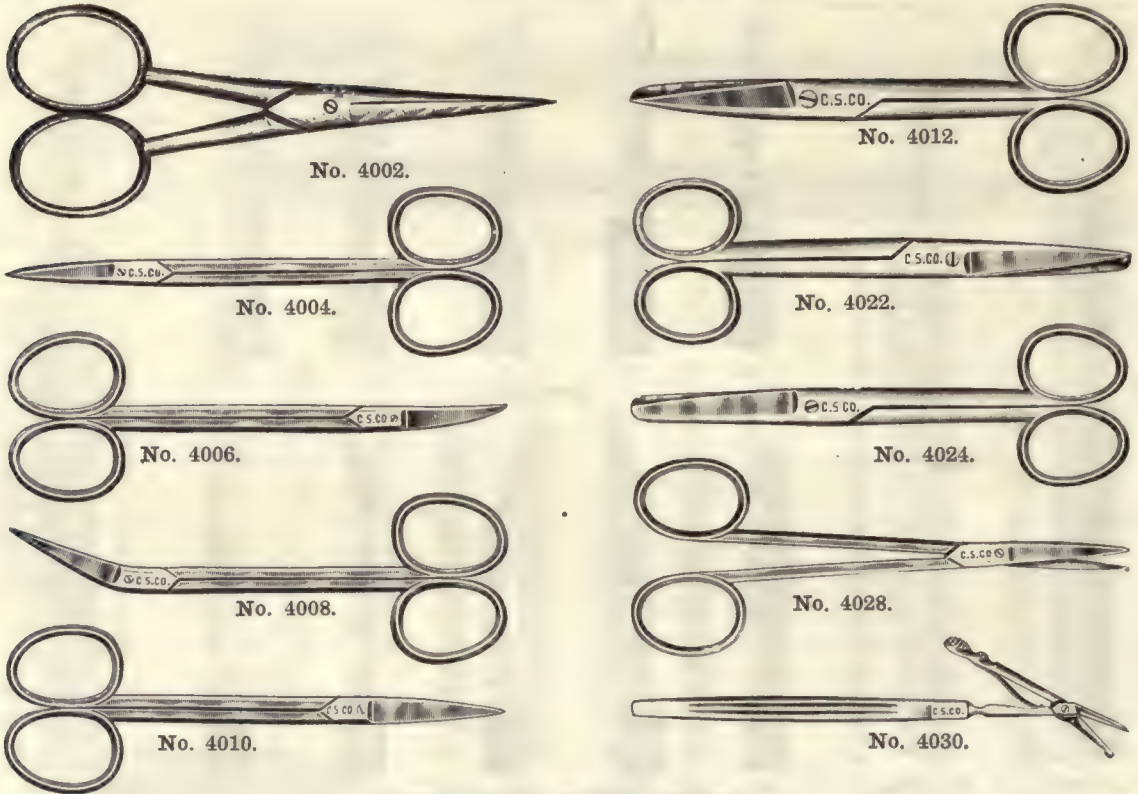
3990. SCALPELS, Grade A, all steel, easily cleaned and sterilized.

No.	A	B	C	D
Length of cutting edge, mm.....	25	32	38	45
Each .....	.85	.85	.85	.85

SCALPELS, SPECIAL SHAPES

3996. SCALPELS, Grade A, with ebony handles.

Style	A	B	C	D	E
Length of cutting edge, mm.....	35	35	35	10	50
Each .....	.60	.70	.70	.60	.80



SCISSORS, DISSECTING

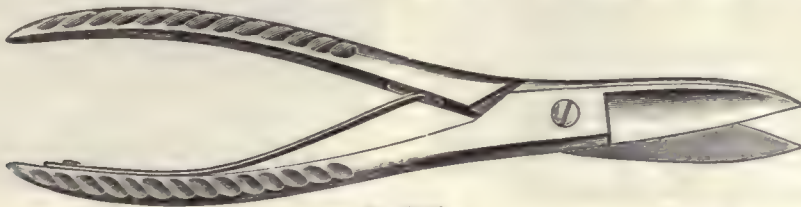
Dissecting scissors are carried in three grades, A, B, and C, and in three degrees of fineness, designated as fine, medium and heavy.

Grade C scissors are made of ordinary cutlery steel, and are suitable for ordinary student laboratory work.

Grade B scissors are made of the best grade of cutlery steel, nickel-plated, and are suitable for precise and delicate work in the advanced and research laboratory.

Grade A scissors are made of the best grade of cutlery, steel, finely finished. They are made with slide lock instead of screw lock, being easily separated for cleaning and sterilization. These scissors can be used for dissecting and surgical work where freedom from bacterial contamination is essential.

4002.	SCISSORS, Grade C, Heavy, nickel-plated, with screw lock, with straight sharp points. Length, 125 mm.....	\$0.45
4004.	SCISSORS, Grade B, Fine, with screw lock. Fine, straight sharp points. Length, 110 mm.....	.85
4006.	SCISSORS, Grade B, Fine, with screw lock. Fine, sharp points, curved upwards. Length, 110 mm.....	1.00
4008.	SCISSORS, Grade B, Fine, with screw lock. Fine, sharp points bent at angle to side. Length, 110 mm.....	.80
4010.	SCISSORS, Grade B, Medium, with screw lock. Medium fine, straight sharp points. Length, 115 mm.....	.85
4012.	SCISSORS, Grade B, Heavy, with screw lock. Heavy, straight points, one sharp and one blunt.	
	No.	A B C D
	Length, mm.....	125 140 150 175
	Each	1.00 1.25 1.50 2.00
4016.	SCISSORS, Grade A, Fine, with slide lock enabling them to be easily taken apart for cleaning and sterilization. Fine, straight, sharp points. Length, 115 mm.....	1.20
4018.	SCISSORS, Grade A, Fine, with slide lock, with fine sharp points curved upwards. Length, 115 mm.....	1.40
4020.	SCISSORS, Grade A, Fine, with slide lock, with fine sharp points, bent at angle to side. Length, 115 mm.....	2.25
4022.	SCISSORS, Grade A, Heavy, with slide lock. Heavy straight points, one sharp and one blunt.	
	Length, mm.....	105 115 125
	Each .....	.90 1.00 1.10
4024.	SCISSORS, Grade A, Heavy, with slide lock. Heavy straight points, both blunt. Length, 140 mm.....	1.50
4028.	SCISSORS, Dissecting, Coronary Artery, screw lock. Fine, straight points, with one sharp and one probe point.....	1.50
4030.	SCISSORS, Invertebrate Dissecting, for the most delicate work. Very fine, sharp points, with all metal handle. Length of cutting edge, 10 mm; total length of scissors, 140 mm.....	4.00



No. 4060.

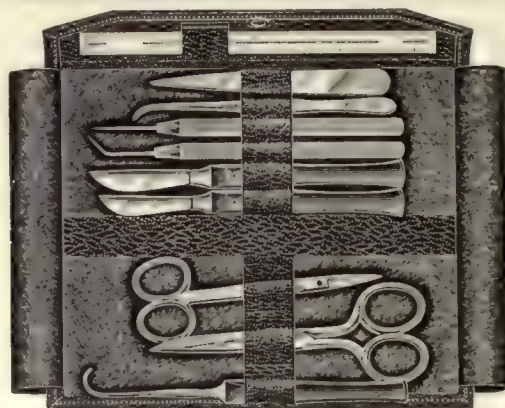
4036. **SECTION LIFTER**, of German silver, with blade 16x18 mm; total length, 100 mm..... \$0.22
4038. **SECTION LIFTER**, with two German silver blades, set in ebony handle. Width of large blade, 10 mm; width of small blade, 6 mm..... .50
4040. **SECTION LIFTER**, similar to No. 4038, but with 6 mm blade only..... .50
4042. **SECTION LIFTER**, with ebony handle, and thin, flexible, German silver blade, 12 mm wide .60
4044. **SECTION LIFTER**, with ebony handle and thin, flexible, German silver blade, 20 mm wide .65
4046. **SECTION LIFTER**, with ebony handle and thin, flexible, German silver blade, 38 mm wide .70
4048. **SECTION LIFTER**, with ebony handle and perforated bowl 18 mm in diameter, for handling delicate specimens60
- SECTION RAZORS**, see **Microtome Knives**.
4054. **SEEKER or Probe**, all steel, nickel-plated, with octagonal handle and bent, blunt point, as used in the anatomical laboratory of the University of Chicago. Length, 145 mm..... .35
4056. **SEEKER or Probe**, all steel, nickel-plated, with hexagonal handle. One end terminates in a fine, sharp point, while the other is curved, with sharp edge and sharp point. Length, 155 mm .40
4060. **SHEARS, Cartilage**, of steel, nickel-plated, with screw joint. Length of cutting edge, 60 mm; total length of shears, 230 mm..... 4.50
4064. **TENACULUM**, ebony handle, steel shank, with tapering sharp hook. Length, 160 mm.... .45
4066. **TENACULUM**, same as No. 4064, but with steel handle. Length, 160 mm..... .90

DISSECTING INSTRUMENT CASES

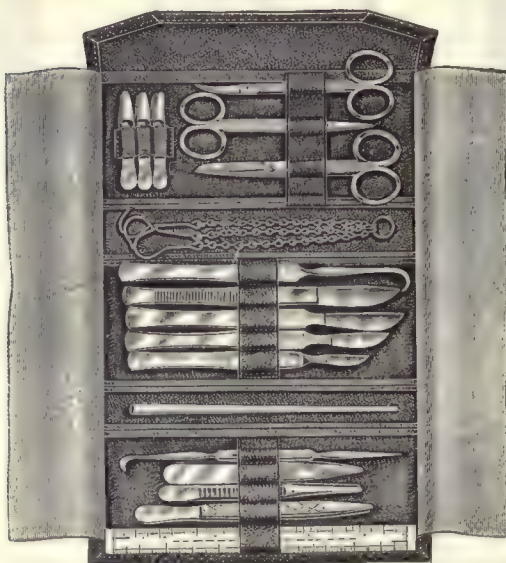
4072. **DISSECTING CASE, Leatherette**, of best quality brown leatherette, almost equal to leather in appearance and durability, single-fold, lined with heavy cloth, and having cloth flaps, button fastener, and loops for 6 instruments..... .30
4074. **DISSECTING CASE, Leatherette**, similar to No. 4072, but two-fold, with loops for 12 instruments55
4076. **DISSECTING CASE, Morocco**, of genuine morocco leather, two-fold, lined with velvet, and having chamois flaps, button fastener, and leather loops for 11 instruments..... 1.50
4078. **DISSECTING CASE, Morocco**, similar to No. 4076, but three-fold, with loops for 17 instruments 1.80



No. 4086.



No. 4092.



No. 4098.

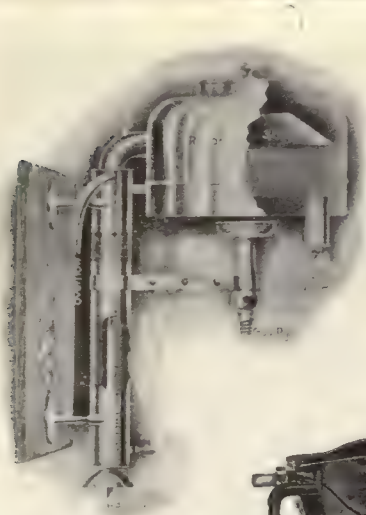


No. 4100.

DISSECTING INSTRUMENTS IN SETS

The following sets have been made up of the instruments which have proved most popular for work in botany, zoology, anatomy, and histology. We will make up special sets to meet any requirements, using preferably the cases in the preceding list.

4084. **DISSECTING SET**, consisting of No. 4072 single-fold Leatherette Case, with the following Grade B and C instruments: No. 3898 Forceps, No. 3932 Needle, No. 3934 Needle, No. 3980B Scalpel, No. 4002 Scissors and No. F661 Rule..... \$1.35
4086. **DISSECTING SET**, consisting of No. 4072 single-fold Leatherette Case, with the following Grade B and C instruments: No. 3898 Forceps, No. 3948 Needle Holder, No. 3950 Needle Holder, No. 3980B Scalpel, No. 4002 Scissors, and No. F661 Rule 1.60
4090. **DISSECTING SET**, consisting of No. 4072 single-fold Leatherette Case, with the following Grade B instruments: No. 3904 Forceps, No. 3906 Forceps, No. 3948 Needle Holder, No. 3950 Needle Holder, No. 3984C Scalpel, No. 4004 Scissors, and No. F661 Rule..... 3.25
4092. **DISSECTING SET**, consisting of No. 4074 two-fold Leatherette Case, with the following Grade B and C instruments: No. 3898 Forceps, No. 3902 Forceps, No. 3932 Needle, No. 3934 Needle, No. 3980B Scalpel, No. 3980C Scalpel, No. 4002 Scissors, No. 4004 Scissors, No. 4064 Tenaculum, and No. F661 Rule..... 3.85
4094. **DISSECTING SET**, consisting of No. 4074 two-fold Leatherette Case, with the following instruments: No. 3902 Forceps, No. 3914 Forceps, No. 3980A Scalpel, No. 3980C Scalpel, No. 4002 Scissors, No. 4004 Scissors, No. 3948 Needle, No. 3950 Needle, No. 8978 Section Razor with folding handle, and No. F661 Rule..... 6.50
4096. **DISSECTING SET**, consisting of No. 4076 two-fold Morocco Case, with the following Grade A instruments: No. 3904 Forceps, No. 3906 Forceps, No. 3924 Cartilage Knife, No. 3948 Needle, No. 3950 Needle, No. 4056 Seeker and Tenaculum, No. 3988C Scalpel, No. 3996A Scalpel, No. 4010 Scissors, and No. F661 Rule..... 6.50
4098. **DISSECTING SET**, consisting of No. 4078 three-fold Morocco Case, with the following instruments: No. 3908 Forceps, No. 3912 Forceps, No. 3914 Forceps, No. 3990A Scalpel, No. 3990B Scalpel, No. 3990D Scalpel, No. 4004 Scissors, No. 4006 Scissors, No. 4012A Scissors, No. 3924 Cartilage Knife, No. 4066 Tenaculum, No. 4056 Seeker, No. 3920 Triple Chain and Hook, No. 3880 Blowpipe, 2 No. 3890 Artery Forceps, No. 3891 Artery Forceps, and No. F661 Rule.. 14.00
4100. **DISSECTING SET, Anatomical**, consisting of No. 4076 two-fold Morocco Case and the following Grade A instruments: No. 3882 Blowpipe, No. 3914 Forceps, No. 3890 Artery Forceps, No. 3924 Cartilage Knife, No. 4054 Probe, No. 4056 Seeker and Tenaculum, No. 3988C Scalpel, No. 3996A Scalpel, No. 3996B Scalpel, No. 4012D Scissors, No. 3920 Triple Chain and Hooks, and No. F661 Rule..... 9.00



No. 4120.



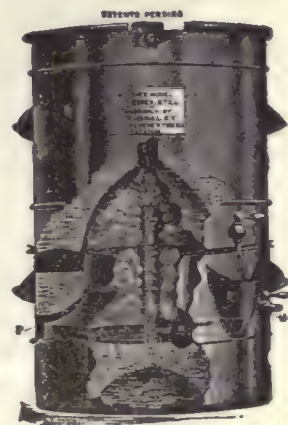
No. 4102.



No. 4122.



No. 4136.

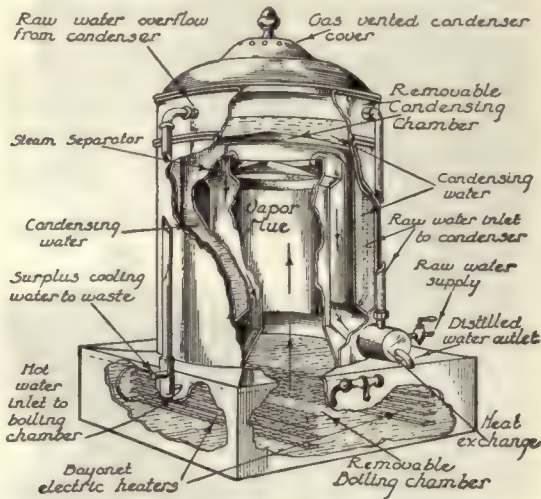


No. 4138.

4102. **DISSOLVING TUBE, Freas**, for dissolving solids which are difficultly soluble without the aid of heat or mechanical agitation, and filtering the solution at the same time. The crystals are placed in A upon a plug of asbestos or cotton. Suction is applied at B, which is then closed, and a circulation starts upward through D and E down through C and F on account of the different densities of the liquids. This will continue until the entire solution is of the same density. Length over all without stop-cock, 37.5 cm; capacity, about 250 cc. With stop-cock, but without bottle or rubber tubing..... \$5.00

DISTILLING APPARATUS FOR WATER

4120. **DISTILLING APPARATUS, Acme Automatic Water Still**. Made to hang on wall and can be placed wherever gas and water connections may most conveniently be made with pipes or rubber tubing. Occupies space 12x4 inches on the wall, projecting only 14 inches in its widest part. Fitted with removable cover to permit inspection if desired. Arranged to secure maximum amount of water for the minimum consumption of gas. Made of copper and brass, tin lined and nickel-plated. Capacity, one gallon per hour and one half. With gas burner. 25.00
4122. **DISTILLING APPARATUS, Automatic Water Still**, of heavy spun copper, nickel-plated, without seams. Can be used on Tripod No. 4123 over Bunsen burner or any convenient source of heat. Diameter of still, 11 inches; height, 13 inches; capacity, 3 quarts per hour with burner using 10 cubic feet of gas. With black tin outlet tube; without burner..... 29.00
4123. **TRIPOD SUPPORT** for No. 4122 Distilling Apparatus. Diameter of rim, 10 inches; height 7 inches 1.75
4136. **DISTILLING APPARATUS, Peerless Automatic**, built on an entirely new principle, as the boiler is so shaped that the steam is forced through the water to its center where it passes in a compact body into the condensing tube, thus reducing the amount of condensation on the side walls of the still. Because of this feature, it produces distilled water at a very low expense for gas. The parts are readily accessible for cleansing. The boiling vessel is of cast iron and not easily burned out or injured by rough handling. The condensing tube is of heavy tinned copper, sufficiently large to insure perfect condensation with a very small stream of water. Finished in bright aluminum and lacquered brass. With gas burner.
- | | | |
|-------------------------|-------|-------|
| Capacity, gallons | 1 | 3 |
| Each | 21.00 | 42.50 |
4138. **DISTILLING APPARATUS, Ralston's New Process**. May be used on any stove and does not require water under pressure. The storage of the distilled water within the still prevents the reabsorption of gases. Although not entirely automatic, it is so constructed that it cannot boil dry; it requires little care or attention. It is made of copper and pure tin. Capacity, from 1 to 3 quarts per hour, depending on the amount of heat used. Weight, 7 lbs.; diameter, 9 inches; height, 14 inches..... 12.00



Nos. 4126-7. (Patent Pending).

Sectional Diagram Showing Details of Construction.

DISTILLING APPARATUS, Cenco Polar, Electrically Heated. This still has been scientifically designed and carefully constructed in accordance with well established engineering principles relating to the efficient evaporation and condensation of water, and possesses certain features not found in other stills.

The condenser has no tubes to become limed up or leaky but consists of three concentric cylinders; the outer one forming the jacket of the still is cooled by radiation, while the inner two are cooled by a constant stream of water circulating between them in a spiral motion. The boiling chamber is designed to maintain a small volume of water at constant level, spread out to afford as large a surface as possible for evaporation.

The vapor flue, through which the steam from the boiling water ascends, is high and wide, preventing any carrying over of impurities due to foaming or bursting of bubbles, or to the velocity of the vapor.

The steam separator at the top of this flue efficiently separates the dry vapor from the liquid particles, rolling them back into the boiler.

The high temperature of the cooling water—from 160° to 180°F.—which is made possible by the large area of condensing surface, effectually cooks out of the raw water any odors or dissolved gases, which pass out through vents in the cover of the still. This hot water is slowly fed to the boiler as required and consumes but little heat in bringing it to the boiling point.

The heaters are of the well known Westinghouse Bayonet type, designed for greatest efficiency.

The interchangeable base makes it possible to lift out the top part of the Cenco Polar Still and set it in another base, equipped for gas or steam heat. This is a feature peculiar to the Cenco Polar Still. All parts of the still are easily accessible for cleaning, as the still can be taken apart without difficulty and can be set up when received with equal ease.

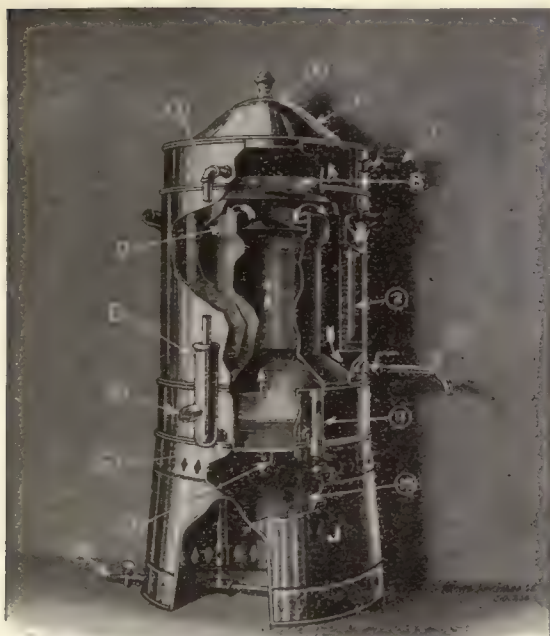
The heat exchange, just above the outlet for distilled water, reduces the temperature to within a few degrees of that of the room. By throttling down the supply of cooling water, distilled water at any temperature up to 200°F. can be obtained. The coil of block tin pipe, through which the distilled water passes on its way through the heat exchange, is surrounded by the cold condensing water just as it enters the still from the tap; consequently there is no opportunity for vapor to escape.

An aerator can be supplied at a small additional charge when it is desired to use the distilled water for drinking purposes.

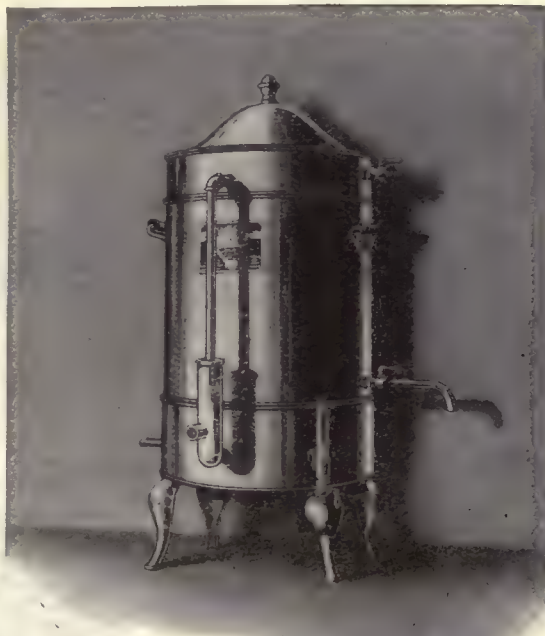
Complete as described, constructed throughout of cold rolled copper heavily tinned, with Westinghouse Bayonet Heaters, attachment cord and three-heat switch for use on either A.C. or D.C. circuits. Sizes A to C are nickel-plated outside; D to F are furnished in burnished copper. All stills are furnished on flat base as illustrated, but may be had mounted on legs without extra charge if specified when ordering. Wall brackets are furnished for attachment to the wall at a small extra charge as listed below. With full instructions for setting up and operating.

No.	A	B	C	D	E	F
Capacity, gallons per hour.....	1	2	3	5	10	15
Height, inches.....	12	13½	15	20	28	32
Diameter, inches.....	10	11	12	13½	15	18
For 110 volts.....	\$80.00	125.00	225.00	375.00	700.00	900.00
For 220 volts.....	87.50	132.50	235.00	375.00	700.00	900.00

4126.
4127.



No. 4132, showing construction.



No. 4133, shown mounted on legs.

EXTRA ELECTRIC HEATERS for Nos. 4126 and 4127.

	For No.....	A	B	C	D	E	F
4128.	Each, for 110 volts.....	\$30.00	35.00	45.00	50.00	60.00	75.00
4129.	Each, for 220 volts.....	37.50	42.50	45.00	50.00	60.00	75.00

4130. **AERATOR**, for use with Cenco Polar Stills, for the introduction of pure sterile air into the water when desired for drinking purposes.

For No.....	A	B	C	D	E	F
Each	4.50	5.50	6.50	7.50	9.50	14.00

4131. **WALL BRACKETS** for use with Cenco Polar Stills, for attachment to wall.

For No.	A	B	C	D	E	F
Per pair	6.00	6.50	7.00	8.00	8.50	9.50

4132. **DISTILLING APPARATUS**, Cenco Polar, same as No. 4126, but equipped with interchangeable base and burner for coal or natural gas. Finished in burnished copper and polished brass.

No.	A	B	C	D
Capacity, gallons.....	1	2	3	5
Each	60.00	100.00	125.00	175.00

4133. **DISTILLING APPARATUS**, Cenco Polar, same as No. 4126, but equipped with interchangeable base and steam coil for steam heat, under a pressure of 10 to 20 pounds. Finished in burnished copper.

No.	A	B	C	D
Capacity, gallons.....	1	2	3	5
Each	60.00	100.00	125.00	175.00

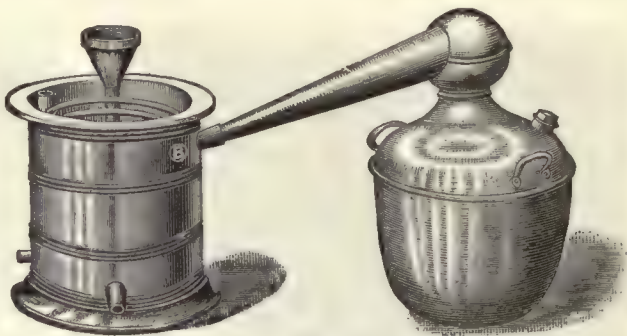
Note:—Nos. 4132 and 4133 may be had in nickel-plated finish at an additional cost of \$5.00.

STILLS OF LARGE CAPACITY

We are prepared to furnish information and prices upon distilling plants of large capacity, up to 1000 gallons per hour. We can place at the disposal of prospective purchasers the engineering knowledge and technical skill of the Jewell Polar Company, gained through years of successful experience in still design and manufacture. Write us at length about your particular problem.



No. 4142.



No. 4148.



No. 4152.



No. 4153.

4142. **DISTILLING APPARATUS, Stokes Automatic, steam heated.** These stills have two features which render them unusually effective in the production of pure distilled water. First, they utilize the heat generated in the still to preheat the incoming water to the boiling point, thus requiring a very small quantity of live steam to keep them in operation after once started. Second, by preheating the feed water before it enters the distilling chamber ammonia and other gases are liberated and permitted to escape into the atmosphere through an opening in the condenser provided for this purpose, preventing their reabsorption by the distilled water. The distilling chamber and condensing cylinder are of cast iron galvanized to withstand corrosion. The condenser tubes are brass, heavily tinned inside and out. These stills may readily be flushed for cleaning by means of a valve connecting with the drain, or the copper lid may be removed and the inner chamber scrubbed. They are self-contained, requiring only the two connections for steam and water, and are shipped ready to set up. Capacities are based on a steam pressure of at least 20 pounds.

No.	A	B	C	D	E	F	G
Capacity per hour, gallons.....	3/4	2 3/4	5	10	25	60	100
Height, feet	2	4	3 1/2	4 1/2	7	7 1/2	7 1/2
Weight, pounds	35	110	275	325	750	1200	1500
Each	\$27.00	65.00	110.00	165.00	275.00	500.00	650.00

DISTILLING APPARATUS FOR SPECIAL USES

4148. **DISTILLING APPARATUS,** copper retort, tin lined, with removable head, connected with pure block tin condensing worm, enclosed in zinc vessel, with proper inlets and outlets.

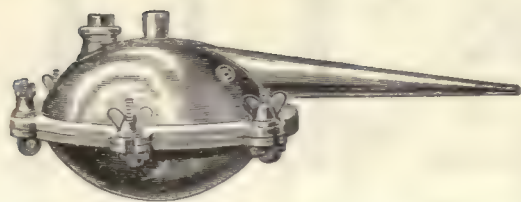
No.	A	B	C	D	E
Capacity, gallons	1 1/2	1	2	3	5
Each	12.85	17.00	22.05	29.25	39.00

4149. **RETORTS** only of No. 4148.

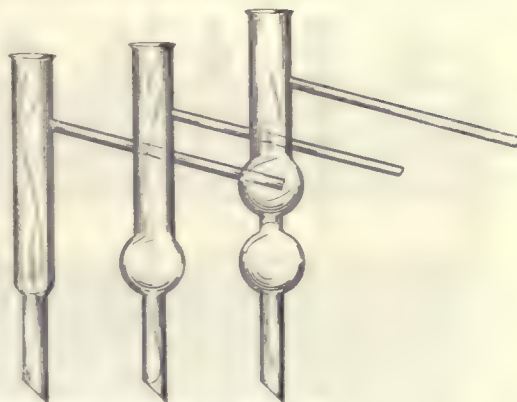
No.	A	B	C	D	E
Capacity, gallons	1 1/2	1	2	3	5
Each	7.35	10.00	13.30	17.75	24.00

CONDENSING VESSEL only of No. 4148, see **Condensers No. 3240.**

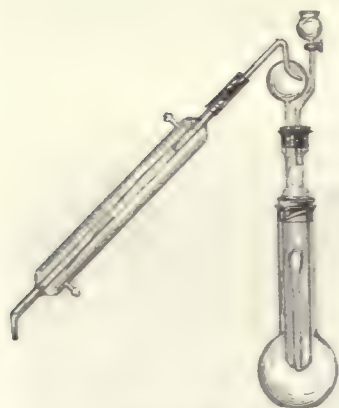
4152. **DISTILLING APPARATUS,** for the destructive distillation of heavy oils and other liquids or solids requiring a high heat. The distillation may be made by live steam or by direct heat, with or without agitation by hot air blown through as desired. The still is of heavy copper with brass fittings. Capacity, 1/2 gallon 17.50



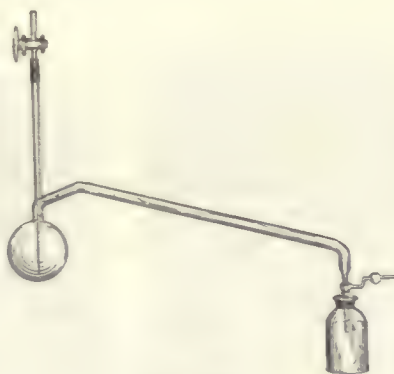
No. 4156.



No. 4168. No. 4170. No. 4172.



No. 4158.



No. 4160.



No. 4162.

4153. **DISTILLING APPARATUS**, similar to No. 4152, but larger and heavier, with cover bolted on and jointed delivery tube. (For illustration, see page 198.)

No.	A	B	C	D
Capacity, gallons	1	2	3	5
Each	\$26.50	39.60	46.20	52.80

4156. **DISTILLING APPARATUS**, for destructive distillation of oils, heavy liquids and solids at high temperatures. Made of heavy copper with brazed seams: with flanges held together by 6 thumb screw clamps. Can be easily taken apart to remove residue.

No.	A	B	C
Capacity, gallons	$\frac{1}{2}$	1	2
Each	33.00	37.50	49.50

4158. **DISTILLING APPARATUS**, Hortvet's, for determining volatile acids in wines or vinegars, designed by Dr. Julius Hortvet of the Minnesota State Food and Dairy Commission. (See Journal of Industrial and Engineering Chemistry, Vol. 1, No. 1, for January 1909, page 31)

8.00

4160. **DISTILLING APPARATUS**, Hulett's, for Mercury, as used by the United States Bureau of Mines. Consists of a 500 cc flask with long neck ending in a stop-cock, side tube, condenser and receiver with ground connections. (See Bulletin 42 of the United States Bureau of Mines)

12.00

4162. **DISTILLING APPARATUS**, Salleron's, of copper, for use in the determination of the percentage of alcohol in wine, beer, cider, etc. Capacity, $\frac{1}{2}$ pint. Complete with alcohol lamp, hydrometer reading from 0 to 100 degrees Proof and Tralle and 100 cc graduated cylinder

13.00

Note:—For **HYROMETERS** for Beer, see No. 7676.

DISTILLING APPARATUS for the determination of ammonia in water, see **Water Analysis Apparatus**.

4168. **DISTILLING TUBE**, for fractional distillation, plain form; length, 9 inches; diameter, $\frac{7}{8}$ in. .20

4170. **DISTILLING TUBE**, with one bulb; length, 8 inches; diameter, $\frac{7}{8}$ inch..... .36

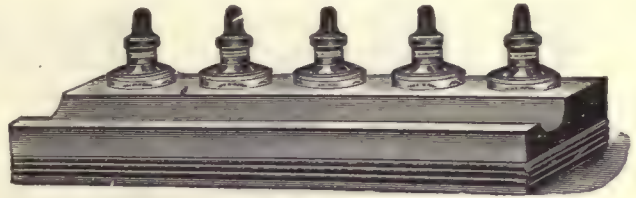
4172. **DISTILLING TUBE**, with two bulbs; length, 10 $\frac{1}{2}$ inches; diameter, $\frac{7}{8}$ inch..... .50



No. 4202.



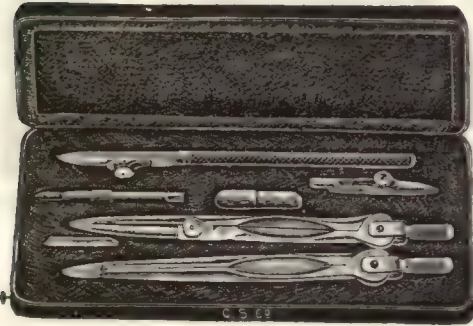
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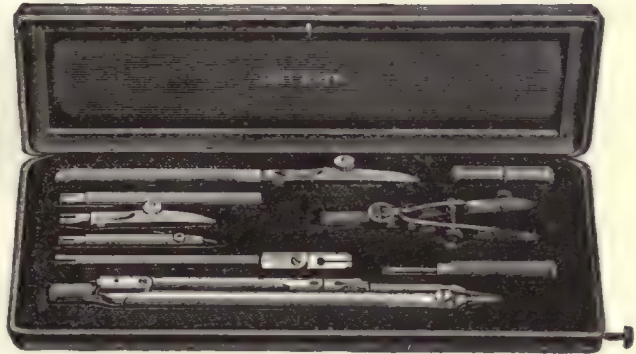
No. 4215.



No. 4218.



No. 4220.



No. 4222.

DRAWING INSTRUMENTS

4200. DRAWING BOARDS, pine wood, with side ledges clamped.

No.	A	B	C
Size, inches	16x22	20x24½	23x31
Each	\$1.25	1.50	2.25

4202. DRAWING COMPASS, steel spring bow pencil compass. Made of German silver, nickel-plated. Steel points, metal handle; length 3½ inches

\$1.25

4204. DRAWING DIVIDER, steel spring bow divider. Metal handle, steel points; length, 3¼ inches.

2.10

4214. DRAWING INKS in the following colors: blue, brick red, brown, carmine, green, indigo, orange, scarlet, vermilion, violet, yellow and waterproof black.

Per ¾ ounce bottle .35

In ordering please state the color desired.

4215. DRAWING INKS in nicely finished hardwood tray. Choice of five different colors, selected from list under No. 4214.

2.30

In ordering please state the colors desired.

4218. DRAWING INSTRUMENTS for elementary work, of brass, in cloth covered case lined with velvet. Contains ruling pen, 5-inch; compass, 4½-inch, with fixed needle point, pen and pencil points and lengthening bar; and plain dividers, 3¾-inch.

2.50

4220. DRAWING INSTRUMENTS, of German silver with steel points, in cloth covered case lined with velvet. Contains ruling pen, 5½-inch; compasses, 6-inch, with fixed needle point, pen and pencil points and lengthening bar; dividers, 4½-inch; bow pen, 3-inch; and box of leads.

7.50

4222. DRAWING INSTRUMENTS, of German silver, American made, of excellent quality, design and finish, in cloth covered case lined with velvet. This is a high grade set; greatly superior to the cheaply made imported sets. All points and blades are ground and polished to the exact degree of fineness required to secure the best results. Complete with 5½-inch ruling pen with aluminum handle; 6½-inch compass and divider of improved design, with 4-inch lengthening bar, pencil and pen points; handle for use with pencil and pen points for ruling work; 3½-inch bow pen; box of leads; hollow handled screw driver and extra points for divider.

10.65



No. 4224.



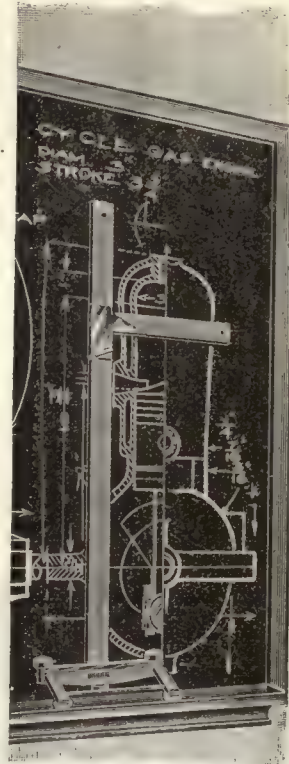
No. 4236.



No. 4226.



No. 4230.



No. 4238 (in use).



No. 4244.

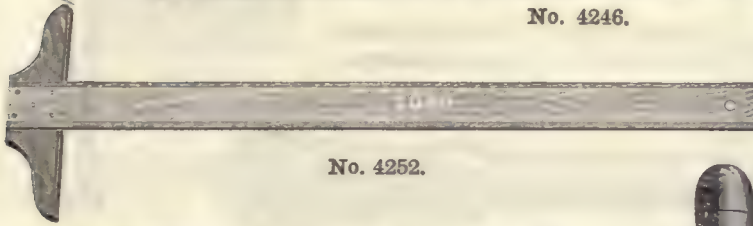


No. 4242.

4224.	DRAWING PEN, Bow , steel spring, with steel points and metal handle.....	\$2.25
4226.	DRAWING PEN, Ruling , spring blade, metal handle	1.75
4230.	BLACKBOARD DRAWING INSTRUMENTS a set of four pieces, consisting of a 24-inch T square, a 36-inch straight edge, a 24-inch triangle graduated in inches, and a 15½ inch protractor. .....Per set	4.50
4231.	T SQUARE only of No. 4230.....	1.00
4232.	STRAIGHT EDGE only of No. 4230.....	.75
4233.	TRIANGLE only of No. 4230.....	1.50
4234.	PROTRACTOR only of No. 4230.....	2.10
4236.	BLACKBOARD COMPASS , of wood, 15 inches long, with crayon holder and rubber foot..	.60
4238.	BLACKBOARD T-SQUARE, Upright T-Square , for use in making mechanical drawings on a blackboard. This device fits into the ordinary chalk tray and is provided with two sets of guiding rollers which keep the blade parallel to the blackboard and yet free from it. An adjustable slide is provided for drawing horizontal lines and both vertical and horizontal blades are graduated. The Upright T-Square is used in the same manner as the Draftsman's T-Square and is of service in any subject requiring drawings, sketches, plots, tabulations or diagrams.	
	No.	A B
	Length, inches	40 46
	For blackboard height, inches.....	42 48
	Each	4.25 4.25
4240.	DRAWING PAPER , slightly grained surface.	
	No.	A B C D
	Size sheet, inches.....	15x20 19x24 22x30 27x40
	Per quire.....	.80 1.00 1.40 3.50
4242.	DRAWING PENCILS , Faber, polished.	
	No.	4H 6H
	Each .....	.12 .12
4244.	RULES, Parallel , ebony.	
	Length, inches	9 12
	Each	1.25 1.40



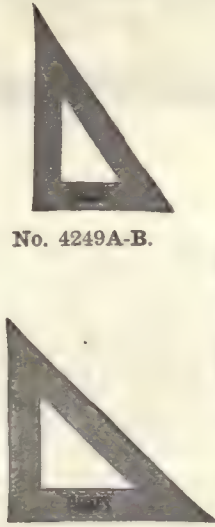
No. 4246.



No. 4252.



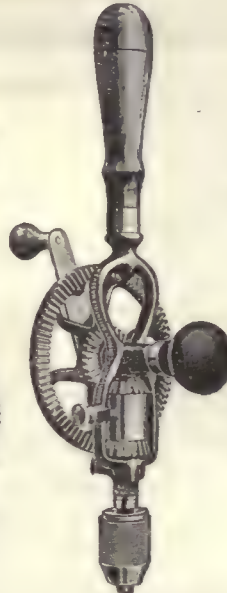
No. 4254.



No. 4249A-B.



No. 4260.



No. 4264.



No. 4258.

4246. **SCALE, Triangular**, boxwood, one edge graduated for 12 inches in $\frac{1}{16}$ ths; the other edges have scales of $\frac{3}{32}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$ and 3 inches to the foot. \$0.50
For **STRAIGHT EDGE**, see No. 12974.

4248. **TRIANGLES, Celluloid.**

No.	A	B	C	D
Angles, degrees	30 & 60	30 & 60	45	45
Longest side, inches	6	8	6	8
Each .....	.30	.45	.45	.60

4249. **TRIANGLES, Hard Rubber.**

No.	A	B	C	D
Angles, degrees	30 & 60	30 & 60	45	45
Longest side, inches	6	8	6	8
Each .....	.20	.30	.30	.35

4250. **TRIANGLES, Pearwood, framed.**

No.	A	B	C	D
Angles, degrees	30 & 60	30 & 60	45	45
Longest side, inches	6	8	6	8
Each .....	.15	.18	.18	.25

4252. **T SQUARES**, pearwood blade and head, fine quality

Length, inches	24	30	36
Each .....	.30	.45	.60

4254. **DRAW KNIFE**, polished cast steel, razor blade, 8-inch

1.30

4256. **DRAW PLATE**, of hardened steel, for drawing wire to smaller sizes. Numbers are not standard gauge, but approximate those of the Starrett gauge. With holes numbered from 1 to 30.

4.00

4258. **DRILL, Breast**, double gears, capacity of chuck 0 to $\frac{1}{2}$ -inch, two speeds; adjustable breast plate; spindle runs in a hardened steel cone bearing

5.50

4260. **DRILL, Hand**, single gear, length $10\frac{1}{2}$ inches, with 8 steel drill points from $\frac{1}{16}$ to $1\frac{1}{64}$ inch; capacity of chuck 0 to $\frac{5}{32}$ inch; holds either fluted or round shank drills. Frame all steel, polished and nickel-plated.

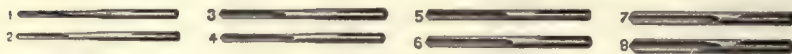
2.65

4261. **EXTRA DRILL POINTS** for No. 4260, plain round shanks. May be used also with Nos. 4258, 4264 and 4270 Drills. In sets of eight, $\frac{1}{16}$ to $1\frac{1}{64}$ inches

.70

4264. **DRILL, Hand**, double gears, two speeds, capacity of chuck 0 to $\frac{3}{8}$ inch; knurled nut; frame of malleable iron, japanned.

4.65



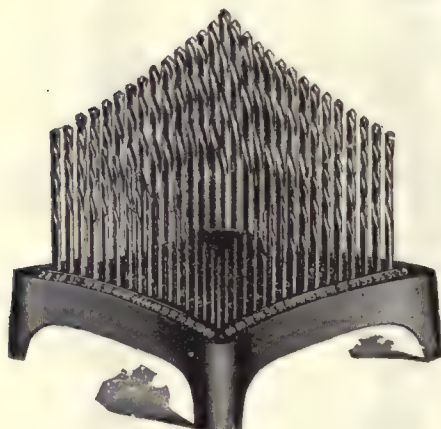
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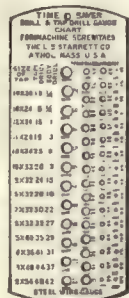
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No. 4350.



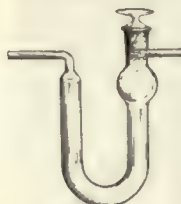
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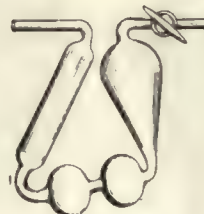
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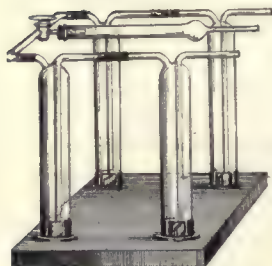
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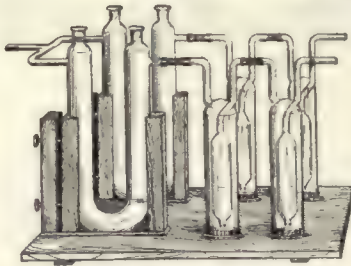
No. 3143.



No. 3144.



No. 4280.



No. 4282.

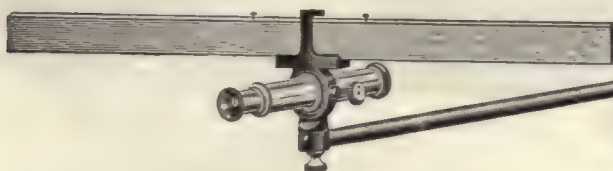


No. 4284.

4266. **DRILL, Hand, Automatic**, 9½ inches long, nickel-plated. Eight steel fluted shank drills, from 1/16 to 1/4 inches, enclosed in the handle in numbered compartments. A very useful tool for boring holes in wood, bone, etc. \$2.00
4267. **EXTRA DRILL POINTS**, fluted shank, as supplied with No. 4266. In sets of eight. Per set .80
4270. **DRILL, Hand, Automatic**, 11 inches long, nickel-plated, with wood handle. Capacity of chuck, 0 to 1/4 inch round-shank drills. Without drill points 2.80
4272. **DRILLS, Twist**, straight round shank, for wood or metal.
- | Diameter, inches | 1/16 | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 |
|------------------|------|-----|------|-----|------|-----|------|------|
| Each | .14 | .16 | .20 | .28 | .36 | .50 | .72 | 1.00 |
4274. **DRILLS, Twist**, straight round shank. Nos. 1 to 60, Stubs' steel wire gage, mounted on neat iron base which can also be used as a **Stubs' Steel and Wire Gage**. Indispensable for the laboratory shop 9.45
4276. **DRILL GAGE**. Stubs' steel gage Nos. 1 to 60. 2.25
4280. **DRYING APPARATUS, Bennert's**, for organic analysis, consisting of four drying jars with sealed in tubes. Mounted on board as shown 13.50
4282. **DRYING APPARATUS, Tauber's**, with 2 U tubes and 4 jars with sealed in tubes. Mounted on board as shown 16.50
- DRYING OVENS**, see **Ovens, Drying**.
4284. **DRYING TUBE, Liebig's**. 1.40
3143. **DRYING TUBE, Vanier's**, for zinc, as used in No. 3138 Vanier Combustion Apparatus. 1.10
3144. **DRYING TUBE, Vanier's**, for sulphuric acid, as used in No. 3138 Vanier Combustion Apparatus. 1.90
4350. **EBULLIOMETER, Salleron's**, of polished copper with jacket around burner; for the rapid estimation of alcohol in wine, beer, etc. Complete in case with directions for use. 60.00



No. F3609.



No. F4453.

Removable
Coil System.

ELECTRICAL INSTRUMENTS, ALL KINDS

BATTERIES, Primary and Storage, see general heading Batteries.

BELLS, Electric, see general heading Bells.

CONDENSERS, Paper and Mica, see Catalog F of Physical Apparatus.

DEMONSTRATION ELECTRICAL APPARATUS, see Catalog F of Physical Apparatus.

ELECTROLYSIS OF WATER APPARATUS, see Lecture Apparatus.

ELECTROLYTIC APPARATUS, see No. 5140.

F3609. **ELECTROMAGNET**, 5 ohm resistance, for instrument making \$1.00

ELECTROSCOPES, see Radioactivity Apparatus.

ELECTROSTATIC APPARATUS, see Catalog F of Physical Apparatus.

FURNACES, see general heading Furnaces.

F4453. **GALVANOMETER**, D'Arsonval, Wall Form. This Galvanometer is a superior instrument, compact in design, and well finished in every detail.

The Magnet is laminated, giving a strong, uniform and permanent field, which is concentrated by a soft iron core. The instrument is mounted on a finely finished hardwood board.

Coil System. As noticed from the illustration, one of the principal features of this Galvanometer is its REMOVABLE COIL SYSTEM. The coil is suspended in a frame and forms with it a UNIT which slides into place by means of guides into a good electrical contact. It is therefore possible, by securing any number of coil systems, to have a universal instrument with only the additional cost of the extra systems. Also, if any adjustments or repairs are to be made on the suspension system, the frame can be removed and laid flat on the table.

Each Galvanometer is supplied with a 250 ohm DEAD BEAT Coil, with a plane mirror of $\frac{5}{8}$ -inch diameter. Extra Coils, Dead Beat and Ballistic, are listed below.

The Suspension. The upper suspension, unless otherwise requested, is a steel ribbon (see No. F4515), which has a high tensile strength and a zero set of less than a millimeter. The sensibility can be much increased by the substitution of phosphor-bronze suspension.

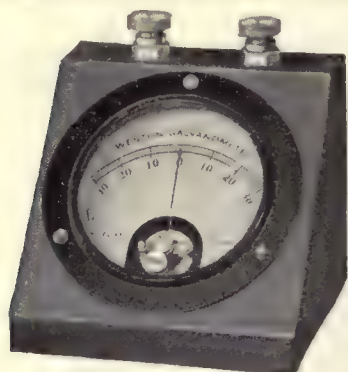
The Reading Device consists of a telescope with achromatic objective and a bichrome scale mounted upon an adjustable arm, which may be entirely removed when not in use.

The Housing is of cast aluminum, combining strength with lightness, and is detachable by loosening two thumb screws, giving easy access to the interior. A large window is provided for viewing the moving system.

Mounting and Leveling. The galvanometer is suspended on the wall by means of two suspension loops on the hardwood board which supports the magnet and housing. These loops are provided with leveling screws and, with a third leveling screw in the center of the base board, provide a convenient means of leveling the instrument.

Sensibility. From the mean of a number of readings the sensibility in megohms was found to be as follows:

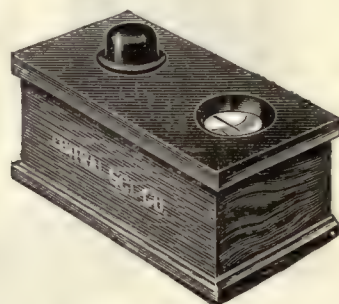
With dead beat coil of resistance, ohms.....	5	250	500
At working distance.....	3.5	33	48
At one meter distance.....	7.3	68	100
Complete with 250 ohm Dead Beat coil, and jeweler's screwdriver			35.00



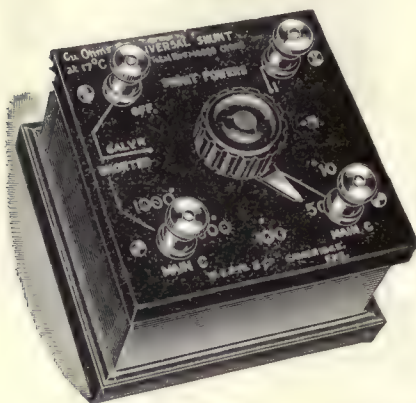
No. F4461.



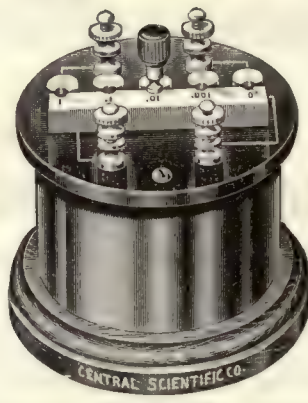
No. F4463.



No. F4465.



No. F4473.



No. F4475.

F4454. **GALVANOMETER, D'Arsonval, Table Form.** Same as No. F4453, but mounted on a heavy tripod for table use..... **\$37.50**

F4456. **COIL SYSTEMS, Dead Beat, for Nos. 4453-4.**

No.	A	B	C
Resistance, ohms	5	250	500
Each	7.50	7.50	8.00

F4457. **COIL SYSTEMS, Ballistic, for Nos. 4453-4.**

No.	A	B	C
Resistance, ohms	150	500	1000
Each	8.50	8.50	9.00

F4461. **GALVANOMETER, Portable, Student's, 9 cm wide by 9 cm high, with inclined scale.** With one volt a deflection of 1 millimeter (1 scale division) will be obtained through 62,500 ohms. Suitable for elementary Wheatstone Bridge work. Complete with zero adjusting device. **11.25**

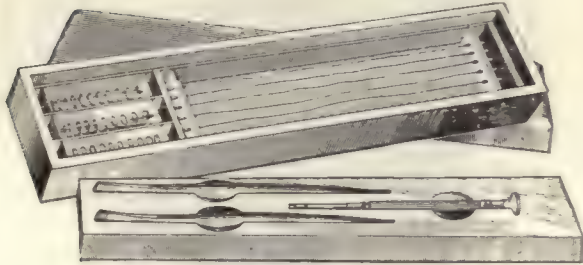
F4463. **GALVANOMETER, Portable, D'Arsonval Type, as used in commercial testing sets, and built for hard service.** Gives 1 scale division deflection with 1 volt through about 100,000 ohms. **15.00**

F4465. **GALVANOMETER, Portable, D'Arsonval Type, as used in our No. F4749 Testing Set.** Has a suspended coil system so that all troubles due to the dulling of the pivots as in the old style instruments is entirely obviated. Sensibility, 1 megohm, i. e., gives one scale division deflection with one volt through 1,000,000 ohms. Mounted on a substantial hard rubber top in a finely finished hardwood case..... **50.00**

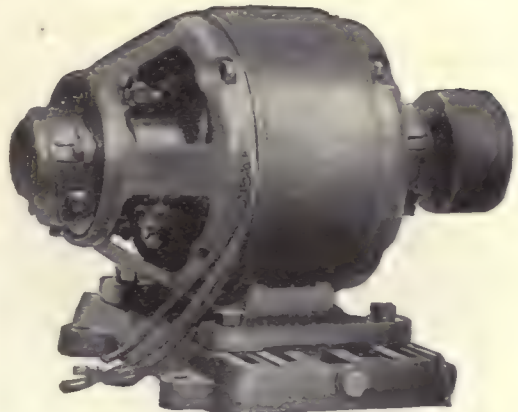
GALVANOMETER ACCESSORIES

F4473. **UNIVERSAL SHUNT, Ayrton-Mather.** This shunt may be used with any galvanometer, and therefore is far more useful than the ordinary type of shunt. The total resistance is 10,000 ohms, with shunt powers of 1, 5, 10, 50, 100, 500 and 1000. It is also fitted with a position in which the galvanometer is shorted through 10,000 ohms, and one in which both circuits are open. All adjustments are made by turning a knob of hard rubber. Mounted in a fine mahogany case with hard rubber top..... **35.00**

F4475. **UNIVERSAL SHUNT, simpler design than No. F4473, but suitable for use with any galvanometer, and therefore far more useful than the ordinary type of shunt.** The total resistance is 5000 ohms, which is sufficiently high for use with any of the galvanometers listed in our catalogs. It is arranged for shunt powers of 1, 10, 100 and 1000, the different adjustments being made by use of a single plug. When the plug is at the zero position the main circuit is complete, but no current can flow through the galvanometer. Mounted in a brass case with wood base and hard rubber top..... **20.00**



No. F4481.



No. 4694.

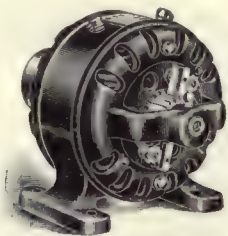
- F4481. **D'ARSONVAL REPAIR KIT.** Consists of a neat wooden box containing two pairs of forceps for handling suspensions, a watchmaker's screw driver, suitable for small screws on any galvanometer, 6 upper steel suspensions (see No. F4515) and 3 lower copper suspensions (No. F4483), all conveniently accessible. For use with No. F4453 Galvanometer..... **\$3.00**
- F4482. **D'ARSONVAL REPAIR KIT.** Same as No. F4481, with phosphor bronze (see No. F4511) instead of steel upper suspension..... **3.00**
- F4483. **LOWER SUSPENSION** only, copper, spiral form, as used on No. F4453 Galvanometer..... **.20**
- F4491. **GALVANOMETER MIRROR**, plane, $\frac{1}{2}$ inch diameter **.35**
- F4492. **GALVANOMETER MIRROR**, plane, $\frac{3}{8}$ inch diameter **.60**
- F4493. **GALVANOMETER MIRROR**, concave, 1 meter focus, $\frac{1}{2}$ inch diameter..... **1.50**
- F4494. **GALVANOMETER MIRROR**, concave, 2 meter focus, $\frac{1}{2}$ inch diameter..... **1.50**
- F4511. **GALVANOMETER SUSPENSION RIBBON**, Phosphor Bronze, 0.001x0.013 inches..Per foot **.10**
- F4512. **GALVANOMETER SUSPENSION RIBBON**, Phosphor Bronze, 0.0007x0.005 inches..Per foot **.10**
- F4515. **GALVANOMETER SUSPENSION RIBBON**, Steel, 0.0013x0.004 inches.....Per foot **.10**

GENERATORS

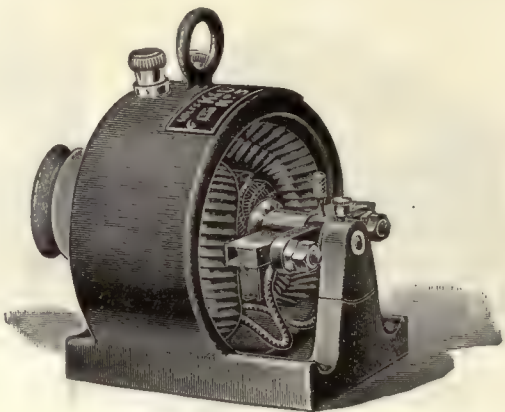
4694. GENERATORS, Dynamos, Shunt Wound, 110 volt. The following General Electric Dynamos are adaptable for all kinds of electrical lighting purposes, charging batteries, etc., etc., and are guaranteed to be free from mechanical or electrical defects. The Dynamos are of approved bi-polar construction, of the inter-pole or regulating-pole type, insuring perfect commutation. The prices include the Dynamos complete with Field Rheostat, Sliding Base and Standard Pulley.

No.	A	B	C	D	E
Power, kilowatts	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	1
No. of 25 watt lamps.....	20	25	30	40	40
Speed, r. p. m.....	2500	1150	2500	2500	1700
Diameter of pulley, inches.....	$3\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
Width of pulley face, inches.....	2	3	2	2	2
Shipping weight, lbs.....	100	185	120	130	170
Each	143.45	210.40	153.75	178.60	202.10
No.	F	G	H	J	K
Power, kilowatts	$1\frac{7}{8}$	2	$2\frac{1}{4}$	3	$5\frac{1}{2}$
No. of 25 watt lamps.....	75	80	90	120	220
Speed, r. p. m.....	2500	1150	1700	1700	1700
Diameter of pulley, inches.....	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{2}$
Width of pulley face, inches.....	2	4	3	4	4
Shipping weight, lbs.....	170	390	270	390	540
Each	207.90	376.70	344.75	376.70	471.20

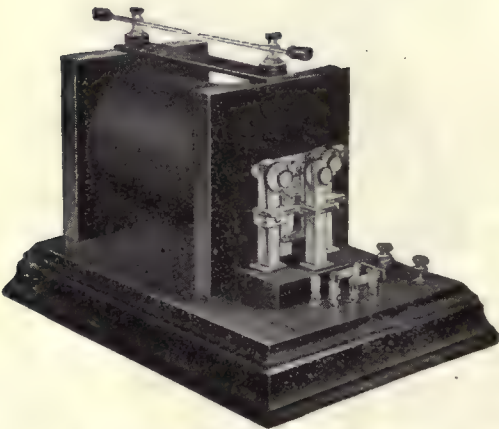
For **DEMONSTRATION DYNAMOS**, see Catalog E.



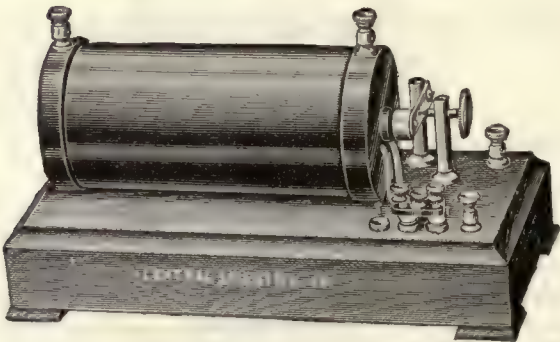
No. 4704.



No. 4708.



No. F3665.



No. F3681.

4704. **GENERATOR, Electric Charging Dynamo**, for charging storage batteries. Similar to No. 4708, but larger, weighing 23 lbs. Generates 7 volts, 11 amperes, at 2000 r. p. m..... \$25.00
4706. **GENERATOR, Electric Plating Dynamo**. Similar to No. 4704, but wound for 4 volts, 15 amperes 25.00
4708. **GENERATOR, Experimental Dynamo**. A shunt-wound dynamo particularly desirable for experimental purposes. It will light to full power twelve 6 volt 3 C. P. lamps. The field is of the ring type, cast solid with the frame. The coils are form wound, carefully taped and shellacked; they are entirely safe from mechanical injury or breakdown. The armature is of the drum type, laminated, slot wound—it does not heat. The commutator is of hard copper, carefully insulated with mica. The brush holders are of new design, of the radial type, mounted on an adjustable yoke. The brushes are of woven wire, self-adjusting—they do not spark. The bearings are of hard bronze, nicely fitted; workmanship throughout the best. Finished in black enamel. Fitted with 1½-inch grooved pulley. Length of shaft, 6 inches. Weight, 9 pounds. Occupies space 6x4¼x6 inches. At speed of 2200 r. p. m., the output is 36 Watts (6 volts, 6 amperes) 12.50

HOT PLATES, see general heading **Hot Plates**.

F3681. **INDUCTION COIL**, with adjustable vibrator or interrupter, commutator and condenser, wound with insulated wire. (The coils ordinarily sold are French coils wound with bare wire.) Mounted on finely polished mahogany box.

No.	A	B	C	D
Spark length, mm.....	6	13	18	25
Each	5.00	9.00	12.00	15.00

F3665. **INDUCTION COIL**, equipped with a patented mechanical circuit breaker, which is mounted independently on a heavy piece of enameled slate. This makes the construction very rigid and increases the efficiency of the coil. The secondaries are built in sections and each section is wound in layers. Three special means of adjustment are provided, allowing a wide range of regulation, so that the coil is adapted for a large variety of work. Complete with a double pole, double throw knife switch. The 150 mm coil will produce a heavy 150 mm spark with an input of 4 volts, 6 amperes (24 watts); the other coils take a proportional input.

No.	A	B	C
Spark length, mm.....	50	75	150
Each	30.00	40.00	75.00

LAMPS, Incandescent, see general heading **Lamps**.



No. 4492.

No. 4494.



No. 4496.



No. 4512.

METERS, POCKET D. C.

These meters are of the permanent magnet type and are extensively used for rapidly measuring the polarity, voltage and amperage of batteries. They are exceedingly dead beat, being made so by the relation of the moving system to the magnetic field and not by friction or air vanes, as in other types. Each instrument is packed in a chamois bag.

4492.	AMMETER. Range 0-30 amperes.....	\$1.00
4494.	VOLTMETER. Range 0-10 volts.....	1.00
4496.	VOLT-AMMETER. Range 0-15 volts and 0-30 amperes	1.20

METERS, CENCO DIRECT CURRENT

PORTABLE TYPE.

A line of dependable electrical measuring instruments at a reasonable price. They are made on the D'Arsonval Galvanometer principle with a rectangular coil of wire rotating in a small annular gap between a core and pole pieces. This gap is traversed by a concentrated uniform field produced by a powerful permanent laminated magnet. The current is carried into and out of the coil by means of non-magnetic springs. The moving element is perfectly balanced between two highly polished jewels. The throw of the coil is stopped by the coil striking its support. This prevents the bending of the pointer and the destroying of the calibration of the instrument. A large window directly over the moving system shows all of the working parts. The meter is enclosed in a dust proof finely finished metal case on a polished mahogany base. Leads are brought to three of our Cenco binding posts, which are recommended for their convenient size and from the fact that their construction will not allow the knurled nuts to be lost.

Ammeters, voltmeters and volt-ammeters can be furnished in the ranges listed below. In each instrument the calibration is guaranteed to 1 per cent. of the full scale.

4504. **AMMETERS, Cenco.**

No.	A	H	C
Range, amperes, zero to.....	1	10	25
Smallest division, amperes.....	0.01	0.1	0.2
Each	12.00	12.00	15.00

4506. **AMMETER, Cenco, with double scale.** Ranges, 0-12 amperes in 0.1 ampere divisions and 0-1.2 amperes in 0.01 ampere divisions..... \$13.00

4508. **VOLTMETERS, Cenco.**

No.	A	B	C	D
Range, volts, zero to.....	5	10	150	250
Smallest division, volts.....	0.05	0.1	1.0	2.0
Each	12.00	12.00	14.00	15.00

4510. **VOLTMETER, Cenco, with double scale.** Ranges, 0-150 volts in 1 volt divisions and 0-7.5 volts in 0.05 volt divisions..... 15.00

4512. **VOLT-AMMETER, Cenco, combined instrument with ranges 0-10 volts and 0-10 amperes in 0.1 unit divisions** 12.00



Model 155.



No. 4524E.



Model 156.

METERS, IMPERIAL—ALTERNATING CURRENT.

METERS, SWITCHBOARD. Standard electromagnet construction, hand calibrated scales, which, as in all A. C. Meters, cannot be used with great accuracy over the first 20 or 25 per cent of their range. Best quality jewel and pivot bearings; brass case, finished in baked enamel and dust proof. Diameter, 4 inches.

4524.	AMMETERS.						
	No.	A	B	C	D	E	F
	Range, amperes	1	3	5	10	15	30
	Smallest division, amperes.....	0.02	0.05	0.1	0.2	0.25	0.5
	Each	\$9.50	9.50	9.50	10.35	10.35	10.65
4526.	VOLTMETERS.						
	No.	A	B	C	D	E	F
	Range, volts	10	15	30	50	150	250
	Smallest division, volts.....	0.2	0.25	0.5	1	2.5	5
	Each	9.50	9.80	9.80	10.35	11.50	12.65

METERS, WESTON—ALTERNATING CURRENT.

METERS, PORTABLE, Model 155. These instruments are perfectly dead beat, extremely sensitive and quickly and accurately respond to the most minute as well as to the greatest fluctuations in current strength, or in potential difference. They may be used on circuits of any frequency, within the limits of engineering practice of today, without sensible error in their indications. Provided with hardened steel pivots, jeweled bearings and mounted in neatly finished dust-proof wood cases. Dimensions 7x7¼x3¼ inches.

4532.	AMMETER , 0-10 amperes.....	\$21.25	4538. VOLTMETER , 0-75 volts.....	23.15
4534.	AMMETER , 0-25 amperes.....	21.25	4540. VOLTMETER , 0-125 volts.....	23.15

METERS, SWITCHBOARD, Model 156. These instruments are of a high standard of excellence, indicate the same whether left in circuit for a minute or permanently, may be used on circuits of any ordinary frequency, are entirely dead beat, and are provided with a remarkably uniform scale. Diameter of case, 7.25 inches; depth of case, 3.15 inches.

4546.	AMMETER , 0-10 amperes.....	16.90	4554. VOLTMETER , 0-75 volts.....	18.15
4548.	AMMETER , 0-25 amperes.....	16.90	4556. VOLTMETER , 0-130 volts.....	18.15
4550.	AMMETER , 0-50 amperes.....	17.20		

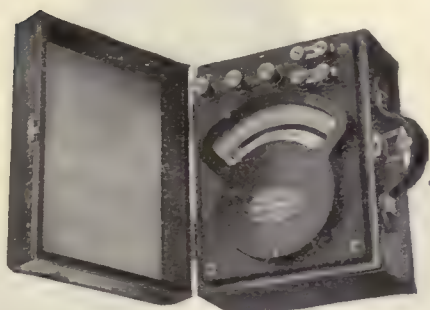
BOTH ALTERNATING AND DIRECT CURRENT.

AMMETERS, PORTABLE, Model 370. Instruments are of the electro-dynamometer type, which may be used either on direct current circuits or on alternating current circuits of any frequency up to 133 cycles per second. Contained in polished mahogany boxes, 8x10¼x5¾ in., with carrying handles, locks and covers. (See illustration on page 211.) The scales are 5¼ in. long and are of necessity not uniform so that they cannot be used with great accuracy over the first 20 or 25% of their range, e. g., the 10 ampere scale is graduated in tenths from 2 to 10 amperes and this range covers 5 in. of the length of the scale. Parallax is prevented by use of mirror scale plates and knife edge pointers; the entire coil system is mounted in a double closed iron shield; the pointer responds very quickly to changes in the applied current; the instruments are not affected by ordinary changes in external temperature and are free from working errors; and an accuracy of ¼ of 1 per cent. of the full scale value is guaranteed on the working part of the scale. For both Alternating and Direct Current.

4572.	MILLIAMMETERS , single range.				
	No.	A	B	C	D
	Range, mil-amperes	50	100	500	750
	Approx. resistance, ohms.....	167	26.5	1.2	0.9
	Each	\$84.40	84.40	84.40	84.40
4574.	AMMETERS , double range.				
	No.	A	B	C	
	Ranges, amperes	2-1	5-2.5	10-5	
	Each	93.75	93.75	93.75	



Model 341.



Model 370. (See page 210.)



Model 310.

METERS, WESTON—(CONTINUED).

VOLTMETERS, PORTABLE, Model 341. These instruments are of the same general description as the Model 370 Ammeters described on page 210. For ordinary measurements, no temperature corrections are necessary. These instruments may be left in circuit continuously, but all ranges above 5 volts are provided with locking contact keys by means of which the circuit may be opened. The 1, 1.5 and 5 volt ranges have a small working error, but on the higher range instruments the working error is inappreciable. For both Alternating and Direct Current.

4576. **VOLTMETERS, single range.**

No.	A	B	C	D	E	F
Range, volts	1	5	10	30	120	300
Approx. resistance, ohms.....	2	18	66	470	2700	6700
Each	\$81.25	81.25	78.15	75.00	75.00	78.15

4578. **VOLTMETERS, double range.**

No.	A	B	C
Ranges, volts	15-1.5	120-60	300-150
Approx. resistance, ohms.....	30-3	2700-1350	6700-3350
Each	87.50	81.25	84.40

WATTMETERS, PORTABLE SINGLE-PHASE, Model 310. These instruments represent the latest development in electro-dynamometer wattmeters and have the same general description as the Model 370 Ammeter described on page 210. The field coils are designed to stand double their normal capacity continuously, and the potential circuits a voltage of 1½ times their normal value. A reversing switch is provided by means of which the direction of the current through the movable coil may be changed without changing the direction through the rest of the potential circuit. This makes it possible to obtain a positive deflection without changing connections. The scales are uniform throughout their entire length. For both Alternating and Direct Current.

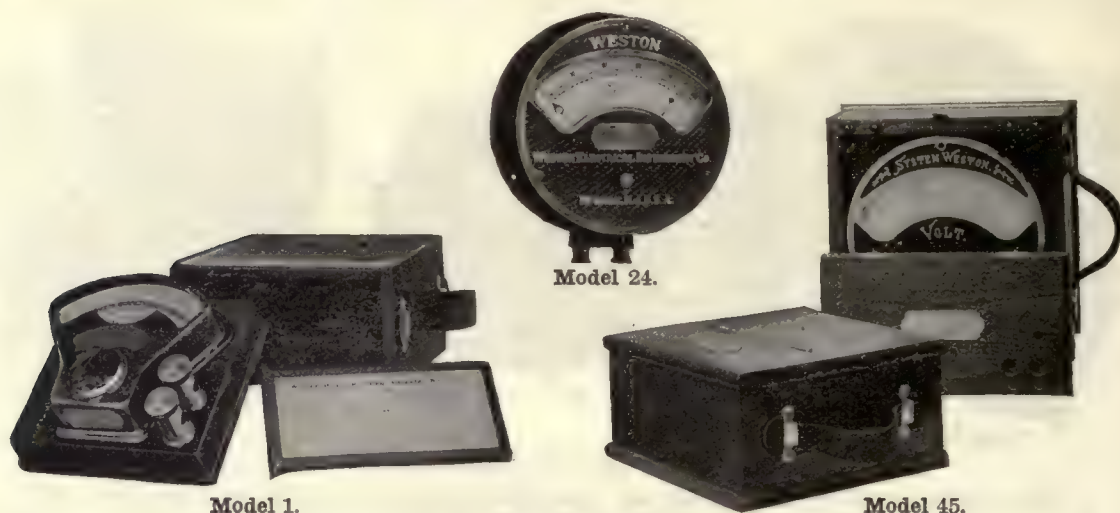
4584. **WATTMETERS, Single-phase, double voltage and current ranges.** Rated voltages of 200 and 100 volts, but will stand 300 and 150 volts without any damage.

No.	A	B	C	D	E	F	G
Normal amperes, series.....	1	2.5	5	10	20	30	50
Normal amperes, multiple....	2	5	10	20	40	60	100
Maximum amperes, series....	2	5	10	20	40	60	75
Maximum amperes, multiple..	4	10	20	40	80	120	150
Kilowatts, field coils in series	0.2/0.1	0.5/0.25	1/0.5	2/1	4/2	6/3	10/5
Kilowatts, field coils in multiple	0.4/0.2	1/0.5	2/1	4/2	8/4	12/6	20/10
No. of scale lines.....	100	100	100	100	100	120	100
Each	93.75	93.75	93.75	93.75	100.00	100.00	100.00

WATTMETERS, PORTABLE POLYPHASE, Model 329. These instruments are of the same general design as the Model 310 Single-Phase Wattmeters, but are larger, the dimensions being 9¼x10½x8 1/16 in. Each instrument consists of two single-phase wattmeters, electrically independent, but having their movable coils mounted on a common shaft so that they rotate together.

4586. **WATTMETERS, Two-phase, double voltage and current ranges.** Rated voltages of 200 and 100 volts, but will stand 300 and 150 volts without any damage.

No.	A	B	C	D
Normal amperes, series.....	1	2.5	5	10
Normal amperes, multiple.....	2	5	10	20
Maximum amperes, series.....	2	5	10	20
Maximum amperes, multiple.....	4	10	20	40
Kilowatts, field coils in series.....	0.6/0.3	1.5/0.75	3/1.5	6/3
Kilowatts, field coils in multiple.....	1.2/0.6	3/1.5	6/3	12/6
No. of scale lines.....	120	150	150	120
Each	143.75	143.75	143.75	150.00



Model 1.

Model 24.

Model 45.

METERS, WESTON —(CONTINUED).

DIRECT CURRENT.

METERS, PORTABLE, Model 45. These instruments are of sufficient accuracy for station work and general testing. The movement is completely enclosed in an iron case (which protects it from stray magnetic fields), securely fastened in a wooden carrying box. This box is provided with a hinge cover which protects the scale and binding posts.

Nos. 4602-6 Meters are provided with self-contained shunt.

No. 4608 Meter has an external shunt.

4600.	MILLIAMMETER, range 0-100 ma. in 1.0 ma. divisions	\$31.25
4602.	AMMETER, range 0-5 amperes in 0.05 ampere divisions	31.25
4604.	AMMETER, range 0-15 amperes in 0.1 ampere divisions	31.25
4606.	AMMETER, range 0-25 amperes in 0.2 ampere divisions	31.25
4608.	AMMETER, range 0-50 amperes in 0.5 ampere divisions	31.90
4610.	MILLIVOLTMETER, range 0-50 mv. in 0.5 mv. divisions	31.25
4612.	VOLTMETER, range 0-5 volts in 0.05 volt divisions	31.25
4614.	VOLTMETER, range 0-15 volts in 0.1 volt divisions	31.25
4616.	VOLTMETER, range 0-150 volts in 1.0 volt divisions	36.90

NOTE.—Double Scale Voltmeters of the above type will be furnished at a price of \$6.25 in addition to the price of the highest range.

METERS, PORTABLE, STANDARD, Model 1. These meters are adjusted and calibrated with the greatest care, and when used properly give exceedingly accurate results. They are direct reading, portable, permanent, and "dead beat," and are, in fact, the recognized standard instruments for laboratory and general testing.

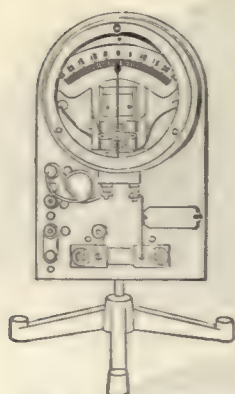
4626.	AMMETER, range 15 amperes, in 0.1 ampere divisions, readable to 0.01 ampere.....	65.00
4628.	AMMETER, range 25 amperes, in 0.25 ampere divisions, readable to 0.025 ampere.....	65.00
4630.	AMMETER, range 50 amperes, in 0.5 ampere divisions, readable to 0.05 ampere.....	65.00
4632.	MILLIVOLTMETER, range 0-20 mv. in 0.2 mv. divisions, readable to 0.02 mv.....	50.00
4634.	MILLIVOLTMETER, zero center, range 10-0-10 mv. in 0.2 mv. divisions, readable to 0.02 mv.....	50.00
4636.	MILLIVOLTMETER, zero center, double range 10-0-10 and 100-0-100 mv. supplied with key by which either range may be employed.....	55.00

Any of the above **MILLIVOLTMETERS** may be supplied with **Shunts** for ampere readings at an additional cost of.....

4638.	VOLTMETER, range 150 volts in 1 volt divisions, readable to 0.1 volt.....	55.00
4640.	VOLTMETER, double range, 150 volts readable to 0.1 volt and 15 volts readable to 0.01 volts.....	75.00
4642.	VOLTMETER, same as No. 4640, but with Reversing Key	77.50

METERS, SWITCHBOARD, Model 24. These small round pattern meters are expressly designed to meet the demand for good but low price instruments for use on switchboards. The total diameter of the front is 6 $\frac{1}{8}$ inches and the total depth 4 inches. They are carefully designed to secure the highest degree of durability and reliability; they are absolutely dead beat, and their indications can be relied upon within 1%. The cases are finished in black japan and are neat in appearance.

4652.	AMMETER, 0-10 amperes in .2 ampere divisions	18.75
4654.	AMMETER, 0-25 amperes in .5 ampere divisions	19.40
4656.	AMMETER, 0-50 amperes in 1 ampere divisions	19.70
4658.	VOLTMETER, 0-10 volts in .2 volt divisions.....	20.00
4660.	VOLTMETER, 0-25 volts in .5 volt divisions.....	20.00
4662.	VOLTMETER, 0-50 volts in 1 volt divisions.....	20.00
4664.	VOLTMETER, 0-130 volts in 2 volt divisions.....	20.65



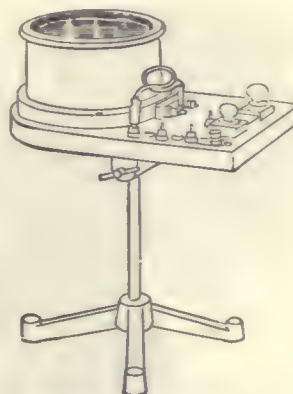
No. 4674 (Vertical).



No. 4687.



No. 4674.



No. 4674 (Horizontal).



No. 4683.

METERS, WESTON—(CONTINUED).

METER, LECTURE TABLE, D. C.

4674. **GALVANO-VOLT-AMMETER.** Combines six different electrical measuring instruments:

- (1) Galvanometer.
- (2) Milli-Voltmeter, range 25-0-25 mv. in 1 mv. divisions.
- (3) Mil-Ammeter, range 25-0-25 ma. in 1 ma. divisions.
- (4) Voltmeter, range 5-0-5 volts in 0.2 volt divisions.
- (5) Voltmeter, range 125-0-125 volts in 5 volt divisions.
- (6) Ammeter, range 25-0-25 amperes in 1 ampere divisions.

The zero is in the center of the scale so that no time need be wasted in determining the positive terminal of a circuit. It is so mounted that it may be used in either of THREE POSITIONS—vertical, horizontal, or inclined at a convenient angle. (These positions are shown in the illustrations above.)

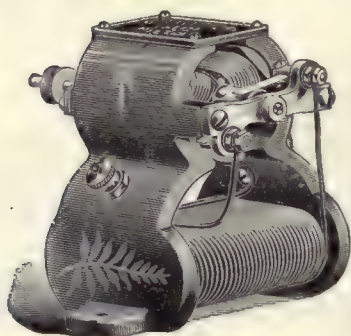
The working parts are fully exposed to view and all connections may readily be traced. It is an extremely sensitive instrument, and having no suspensions, mirrors or adjustments to get out of order, is always ready for use. Among many uses are the following: The MEASUREMENT OF VOLTAGE, AMPERAGE AND RESISTANCE OF BATTERIES; the DETERMINATION OF RESISTANCE, CONDUCTIVITY, etc., of the various metals; the MEASUREMENT OF THE THERMO-ELECTRIC EFFECTS of different metals; as a CURRENT INDICATOR IN WHEATSTONE BRIDGE WORK; and as a LECTURE TABLE GALVANOMETER \$40.00



No. 4686.

METERS, LECTURE TABLE, D. C.

4682. **AMMETER**, with zero at left of scale, mounted vertically in a dust-proof case, for demonstration work. Very sensitive, and always ready for use. Range 0-1 ampere in 0.01 ampere divisions. 27.50
4683. **EXTRA SHUNT**, to make No. 4682 read 0 to 10 amperes in 0.1 ampere divisions. 5.00
4686. **VOLTMETER**, same style and mounting as No. 4682. Range 0-4 volts in 0.05 volt divisions. 27.50
4687. **EXTRA COIL**, to make No. 4686 read from 0 to 120 volts in 1.5 volt divisions. 5.00



No. 4716.



No. 4720.



Nos. 4730-1 (F-G).



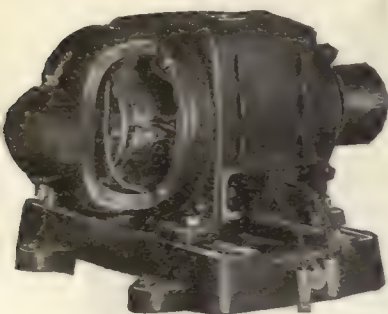
No. 4724.

MOTORS

- 4716. MOTOR, Porter Battery No. 1.** A standard article, perfect in every detail of design and construction, and accurately made. Nicely finished in black enamel. 1/100 h. p., 1.5-3 volts, 1.5 amperes, 5500 r. p. m.; size, $3\frac{1}{4} \times 3\frac{1}{4} \times 3\frac{1}{4}$ inches; weight, $1\frac{1}{2}$ lbs. **\$4.00**
- 4717. MOTOR, Porter Battery No. 2.** Same as No. 4716, but 1/90 h. p., 3-5 volts, 2 amperes, 4000 r. p. m.; size, $3\frac{3}{4} \times 4 \times 4\frac{1}{4}$ inches; weight, $2\frac{3}{4}$ lbs. **7.00**
- 4720. MOTOR, Universal.** This motor may be used on 110 volt either Alternating (60 cycle) or Direct Current. Will develop approximately 1/50 h. p., is efficient and will not heat up when operating on either circuit. It is constructed in a substantial manner, having laminated fields and armature and a twelve-section copper commutator. It uses a $\frac{3}{16}$ -inch carbon brush and is equipped with compression grease cups and bronze bearings which insure perfect lubrication. It weighs $4\frac{1}{4}$ pounds, is 5 inches high and consumes about the same amount of current as one 8 candle power lamp. **8.00**
- 4724. BATTERY RHEOSTAT,** for regulating the speed of small motors, and also for use with miniature battery lamps. This rheostat is nicely finished with nickel trimmings and rubber handle. Resistance, 0 to 5 ohms. **1.40**

MOTORS, Alternating Current, Single Phase, 60 Cycle. These General Electric A. C. Power Motors are of the Split Phase Induction Type for constant speed and continuous service.

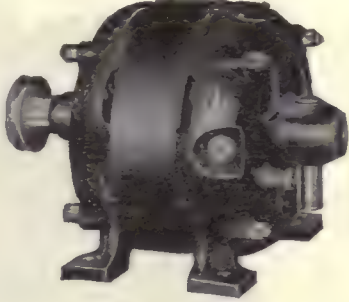
No.	A	B	C	D	E	F	G
H. P.	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$
Speed, r. p. m.	1725	1140	1725	1140	1725	1140	1725
Diameter of pulley, inches.	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{1}{2}$
Width of pulley face, inches.						$1\frac{1}{4}$	$1\frac{1}{4}$
Shipping weight, lbs.	24	27	27	28	28	41	41
Grooved for $\frac{1}{4}$ -in. round belt.							
4730. MOTORS, 110 volts. Each	25.85	26.95	26.95	30.80	30.80	41.80	41.80
4731. MOTORS, 220 volts. Each	26.95	28.05	28.05	31.90	31.90	42.90	42.90



No. 4736.



No. 4746.



No. 4756-7 (A-F).

4734. **MOTORS, Alternating Current, Single Phase, 60 Cycle.** These General Electric A. C. Power Motors are of the Repulsion Induction Type for constant speed and continuous service. They are so built that they may be used on either 110 volt or 220 volt current. This type of motor requires less starting current than the Split Phase Induction Type and its use is required by some central power stations.

No.	A	B	C	D	E	F	G
H. P.	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
Speed, r. p. m.	1725	1140	1725	1140	1725	1140	1725
Diameter of pulley, inches...	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
Width of pulley face, inches..	Grooved	1	1	2	2	2	2
Shipping weight, lbs.	32	40	40	55	55	80	80
Each	\$39.60	52.80	50.60	67.10	62.70	\$80.30	79.20

4736. **MOTORS, Alternating Current, Single Phase, 60 Cycle.** These General Electric A. C. Power Motors are of the repulsion induction type especially adapted to loads requiring heavy starting torque and have the same high operating characteristics as a D. C. Compound Motor. They are provided with sliding base as shown in illustration above. They can be used on either 110 or 220 Volt, 60 Cycle, Alternating Current.

No.	A	B	C	D	E
H. P.	1	1	$1\frac{1}{2}$	2	2
Speed, r. p. m.	1800	1200	1800	1800	1200
Diameter of pulley, inches....	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
Width of pulley face, inches....	2	2	2	2	3
Shipping weight, lbs.	160	175	185	175	215
Each	102.30	123.20	117.70	134.20	166.10

4746. **MOTORS, Alternating and Direct Current, General Electric.** The application of small power motors in industrial and domestic lines has increased to such enormous extent that small motors, of exceptional quality and lightness, are now available at low prices. They are series wound for continuous service, and will not develop an excessive speed when the entire load is thrown off. The A. C. motors operate on 110 volts 60 cycles, and will also operate on 110 volt direct current. The D. C. motors will operate **only** on 110 volt direct current.

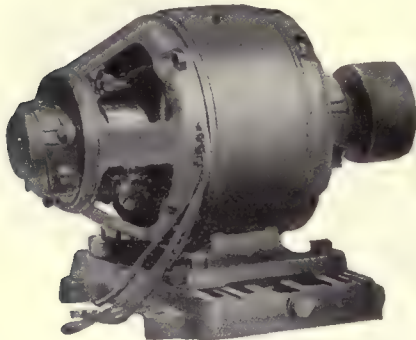
No.	A	B	C	D	E	F	G	H
H. P.	$\frac{1}{200}$	$\frac{1}{200}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{50}$	$\frac{1}{50}$	$\frac{1}{25}$	$\frac{1}{25}$
Current	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.
Speed, r. p. m.	2200	2200	2200	2200	1800	1800	1800	1800
Diam. of V-groove pulley, inches,	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$
Shipping weight, lbs.	10	10	10	10	15	15	24	24
Each	11.30	11.55	12.65	12.65	15.15	15.70	18.70	19.00

MOTORS, Direct Current, General Electric. For constant speed and continuous service. Nos. A to D are shunt wound; the others compound wound.

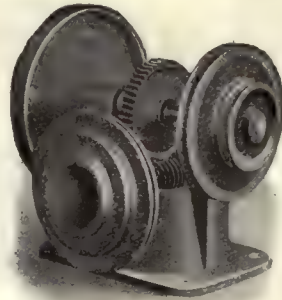
No.	A	B	C	D	E	F	G	H	J	K	L
H. P.	$\frac{1}{30}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{2}$
Speed, r. p. m.	1140	1725	1140	1725	1140	1725	1140	1725	1140	1725	1140
Diam. of pulley, inches.	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{7}{8}$	$1\frac{7}{8}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$
Width of pulley face, inches...	Grooved for $\frac{1}{4}$ -inch round belt.						$1\frac{1}{4}$	$1\frac{1}{4}$	2	2	2
Shipping weight, lbs.	24	24	24	24	24	24	28	28	50	50	51

4756. **MOTORS, 110 volts.**
Each 20.90 20.90 23.10 23.10 25.85 25.85 35.20 35.20 64.90 64.90 79.20

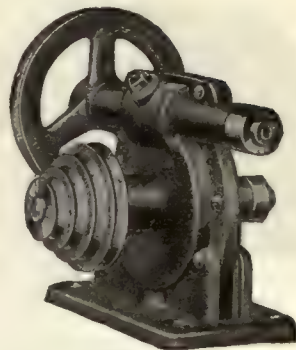
4757. **MOTORS, 220 volts.**
Each 22.00 22.00 24.20 24.20 26.95 26.95 36.30 36.30 66.00 66.00 80.30



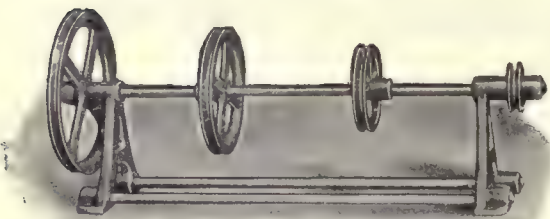
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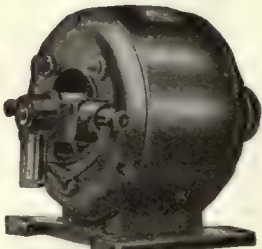
No. 4814.



No. 4816.



No. 4810.



Nos. 4772-4777.

MOTORS, Direct Current, General Electric. These D. C. Power Motors are compound wound, constant speed, continuous service, Oil Ring Bearing Type, complete with no voltage release starting rheostat, sliding base and standard pulley of 4½-inch diameter and 2-inch face.

	No.	A	B	C	D	E
	H. P.	¾	¾	1	1	2
	Speed, r. p. m.	1700	1150	1700	1150	1700
	Shipping weight, lbs.	120	130	130	170	170
4760.	MOTORS, 110 volts.	Each \$71.50	85.80	79.20	93.50	102.30
4761.	MOTORS, 220 volts.	Each 71.50	85.80	79.20	93.50	103.40

MOTORS, Direct Current, Cenco. Series wound for 1800 r. p. m. at the rated H. P. Speed varies with load.

	No.	A	B
	H. P.	½	¾
	Net weight, lbs.	12	14
4772.	MOTOR, 110 volts.	14.40	14.40
4773.	MOTOR, 220 volts.	15.00	15.00

MOTORS, Direct Current, Cenco. Shunt wound, for 1800 r. p. m. Speed independent of load.

	No.	A	B	C
	H. P.	½	¾	1
	Net weight, lbs.	12	14	17
4776.	MOTOR, 110 volts.	14.40	14.40	17.00
4777.	MOTOR, 220 volts.	15.00	15.00	18.50

4810. COUNTERSHAFT ¼ inch in diameter and 12 inches long, with bearings and pulleys 1, 2, 3 and 4 inches in diameter. The pulleys are bored and grooves turned true with the shaft, to which they are fastened with set screws, so that their position on the shaft may be changed. Used in connecting small engines and motors with other machinery 2.40

4814. SPEED REDUCING GEAR. An improved device by which the high speed of an engine or motor is converted into a slow, powerful motion. The round plate may be removed, if desired, and direct connection made to shaft. Geared 48 to 1. Pulleys grooved for 7/32-inch round belt. The fast running pulley has diameters 2, 3 and 4 inches, and the slow running pulley diameters 2 and 4 inches, thus giving a wide range of speeds 7.20

4816. SPEED REDUCING GEAR. Similar to No. 4814, but with the gear enclosed in a case which is filled with grease so that the gear will run silently and without attention for a long time. Geared 48 to 1. Pulleys grooved for 7/32-inch round belt. The fast running pulley is 4 inches in diameter and the slow running pulley has diameters 1, 1½, 2 and 2½ inches, thus giving a wide range of speed 10.80

For other **MOTORS** in addition to those listed, see Nos. 2361, 2362, 2398 and 2399.



Nos. 4824-4837.

MOTOR GENERATORS

A. C. to D. C.

**DIRECT CURRENT NOW AVAILABLE WHEREVER THERE ARE
ALTERNATING CURRENT MAINS.
FEATURES.**

Generator shunt wound.
Generator and Motor armatures mounted on same shaft.
Motor has revolving primary and is well ventilated.
Radial brushes set on neutral. Cartridge type brushholders used.
No sub-base required. Sets may be bolted direct to support.
No starting box needed.
Useful for Battery Charging.

Use of two-bearing construction makes set compact and efficient.
Generous size bearings equipped with ring oilers.
Heavy four arm bearing flanges with ample ventilating ducts.
Four thru bolts hold parts firmly together.
The voltage chosen may be varied 25% above and below normal rating by means of the Field Rheostat furnished with each set.

MOTOR GENERATORS, A. C. to D. C. With single phase, 60-cycle Motor, and Generator wound for 6, 12, 18 or 24 volts D. C. (State voltage desired when ordering.)

No.	A	B	C	D
Output, watts	50	100	175	250
Shipping weight, lbs.	49	69	90	155
4824. MOTOR GENERATORS, with 110 volt motor.	\$59.40	68.20	85.80	137.50
4825. MOTOR GENERATORS, with 220 volt motor.	60.50	69.30	86.90	138.60

MOTOR GENERATORS, A. C. to D. C. With single phase, 60-cycle Motor, and Generator wound for 60, 125 or 250 volts D. C. (State voltage desired when ordering.)

No.	A	B	C	D	E
Output, watts	100	175	250	375	500
Shipping weight, lbs.	69	90	155	160	165
4828. MOTOR GENERATORS, with 110 volt motor.	62.70	82.50	123.20	155.10	172.70
4829. MOTOR GENERATORS, with 220 volt motor.	63.80	83.60	124.30	156.20	173.80

NOTE: Motors for other frequencies may be obtained at a slight advance in price.

D. C. to D. C.

Sets with the same features as those described above are listed for service on 110 or 220 volts Direct Current.

MOTOR GENERATORS, D. C. to D. C. With direct current Motor, shunt wound, and Generator wound for 6, 12, 18 or 24 volts D. C. (State voltage desired when ordering.)

No.	A	B	C	D
Output, watts	50	100	175	250
Shipping weight, lbs.	49	69	90	155
4832. MOTOR GENERATORS, with 110 volt motor.	50.60	61.60	80.30	132.00
4833. MOTOR GENERATORS, with 220 volt motor.	51.70	62.70	81.40	133.10

MOTOR GENERATORS, D. C. to D. C. With direct current Motor, shunt wound, and Generator wound for 60, 125 or 250 volts D. C. (State voltage desired when ordering.)

No.	A	B	C	D	E
Output, watts	100	175	250	375	500
Shipping weight, lbs.	69	90	155	160	165
4836. MOTOR GENERATORS, with 110 volt motor.	57.20	75.90	117.70	146.30	167.20
4837. MOTOR GENERATORS, with 220 volt motor.	58.30	77.00	118.80	147.40	168.30

For MOTOR GENERATORS with Switchboard see next page.



Nos. 4842-4848.

MOTOR GENERATORS with Switchboard. These motor generators will meet the demand for a self contained outfit for the laboratory, which may be used to furnish the regular laboratory current and is especially valuable for battery charging. The outfits consist of a **Motor Generator Set** of the type described on page 217, with the generator for from 24 to 72 volts D. C., depending on the output, and a steel **switchboard panel**, mounted as in the illustration and having the following

FEATURES.

Voltmeter for reading voltage.

Push button to be pushed when reading voltmeter.

Snap switch for closing and opening battery circuit.

Ammeter for reading charging current.

Rheostat for adjusting charging current.

Snap switch in line circuit for starting and stopping.

Field rheostat for adjusting voltage.

The field rheostat will reduce the voltage of any set to 25 per cent of its normal rating, but the charging rate used must not exceed the ampere rating marked on the generator nameplate.

No.	A	B	C	D	E
Output, watts	175	250	375	500	750
Voltage of generator.....	24	24	36	48	72
Shipping weight, lbs	105	170	175	180	200

4842. MOTOR GENERATORS , with 110 volt, A. C., single phase, 60-cycle motor.....	\$115.50	169.40	201.30	218.90	255.20
4844. MOTOR GENERATORS , with 220 volt, A. C., single phase, 60-cycle motor.....	116.60	170.50	202.40	220.00	256.30
4846. MOTOR GENERATORS , with 110 volt, D. C., shunt wound motor.....	111.10	160.60	193.60	213.40	
4848. MOTOR GENERATORS , with 220 volt, D. C., shunt wound motor	112.20	161.70	194.70	214.50	

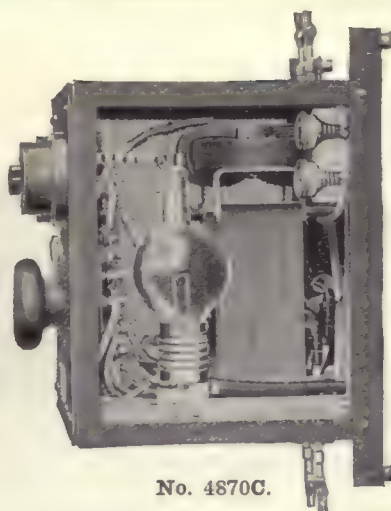
NOTE: Nos. 4842-4 B, C, D and E can be furnished with three-phase motors for 5 per cent. more than the above prices.



No. 4866.



No. 4870A-B.



No. 4870C.

OVENS, see general heading **Ovens**.RADIOACTIVITY APPARATUS, see general heading **Radioactivity Apparatus**.

RECTIFIERS

4866. **RECTIFIER, ELECTROLYTIC, or NODON VALVE.** Consists of four cells with electrodes of lead and aluminum, and depends for its action on the fact that an electric current will not enter the electrolyte from the aluminum electrode, but will pass freely into the electrolyte from the lead. The electrodes are fastened to a substantial non-conducting top, with binding posts for both A. C. and D. C. circuits. The connections are made by straps of metal, so that the path of the current is readily traced.

This valve, though not as satisfactory as a Motor Generator, may be used on either 110 or 220-volt alternating circuit with a moderately high efficiency. Currents of from 5 to 8 amperes may be obtained for laboratory use, and for short periods of time, much larger currents may be drawn from the valve. Complete with chemicals, glass jars, and full directions..... \$19.00

4867. **CHEMICALS** for No. 4866, per complete charge50

4868. **GLASS JAR** for No. 4866, for replacements..... .40

4870. **RECTIFIERS, TUNGAR.** These rectifiers consist of a bulb filled with an inert gas at low pressure and having for cathode a filament of small tungsten wire coiled into a closely wound spiral and for anode a piece of graphite of relatively large cross section. The tungsten filament is heated to incandescence by being placed in the secondary circuit of a transformer, which is part of the outfit. This incandescent filament, as is well known, emits electrons and ionizes the rarified gas in the bulb, which thus becomes a conductor of electricity. In addition to being in the secondary circuit of the transformer, the tungsten filament is connected to one terminal of the A. C. line and the graphite electrode to the other terminal. During the half-cycle in which the filament is negative, the electrons being themselves negative are driven from the filament and across to the graphite positive electrode, ionizing the gas molecules as mentioned above and permitting the passage of a current. During the other half of the cycle when the filament is positive, if any electrons are emitted, they are immediately attracted to the filament again, so that the gas remains non-conducting. Since the direction of a current is opposite to the direction in which the negative electrons travel, it is evident that the current passes during each alternate half-cycle from the graphite electrode to the tungsten filament through the bulb. We therefore have in the circuit of the bulb a pulsating unidirectional current.

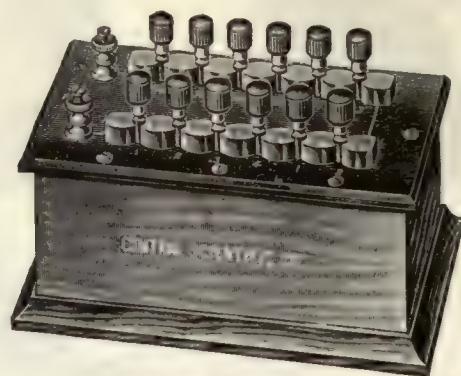
This current is especially adapted to battery charging but may be used for many other purposes such as in electrolytic experiments, electro-plating, for running small motors, etc.

Tungar Rectifiers are designed for 115 volt, 60-cycle circuit, but may be used on from 105 to 125 volt circuit. They are mounted in a black japanned casing, with a perforated top. This casing contains the bulb, the transformer and a fuse to protect against overloads. These rectifiers are especially superior to many rectifiers on the market in that they operate satisfactorily when only a fraction of their full output is being used. Nos. A and B are provided with legs for placing on floor or table; No. C is intended for wall installation, and is provided with ammeter. Furnished with cord and plug for attachment to any incandescent lamp socket.

No.	A	B	C
Output, full load, watts.....	15	90	450
Amperes, full load.....	2	6	6
Volts, full load.....	7.5	15	75
Height, inches.....	8¼	10	14
Depth, inches.....	5¾	8	12¾
Width, inches.....	6¼	6¼	10¾
Shipping weight, lbs.....	12	24	81
Each.....	16.00	24.00	115.00
4871. TUNGAR BULB only, renewal.....	3.00	7.00	8.00



No. F4701.



No. F4703.

RESISTANCE BOXES AND WHEATSTONE BRIDGES

In the construction of our resistance boxes we use high grade rubber plates for the tops, of sufficient thickness to insure a firm anchorage for the brass bars, and the best obtainable wire.

All coils are wound bifilar in uniform layers and are practically free from inductance and capacity so that any of the boxes may be used in conductivity experiments with alternating currents. The coils are securely fastened to the top, so that there is no danger of the spools breaking loose and destroying the connections.

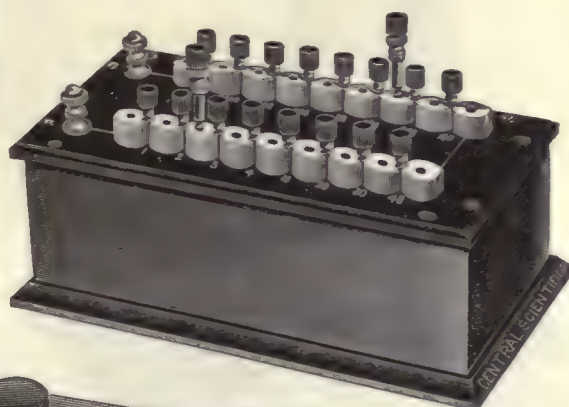
Our plugs are provided with knurled hard rubber tops moulded on, which prevents removal. The plugs are carefully fitted, giving good contacts, and are placed sufficiently far apart to insure easy manipulation. The brass blocks are heavy and separated so that the insulation between may be cleaned.

We guarantee, without reservation, all our boxes to be accurate within the per cent. claimed, and any boxes will be replaced that show faulty construction or do not come up to the guaranteed accuracy when compared with reliable standards.

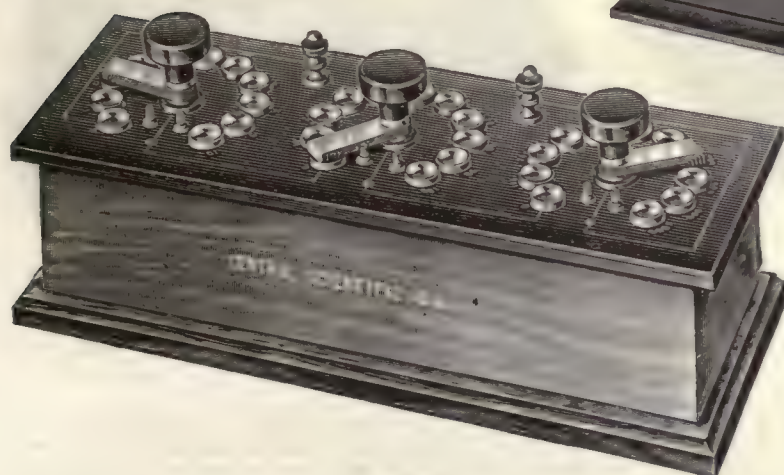
- F4701. RESISTANCE BOX, Spring Contact Design.** The greatest objection to the plug form resistance box, when used by inexperienced workers, is the unreliability of the contacts, caused either by the loosening of the adjoining plugs when one is withdrawn or by a loose fit, caused either by exchange or failure to properly insert the plugs. As will be noticed in the above illustration, these dangers have been obviated by the use of the spring contact, which, on account of the taper, fits tightly all points of the plug, causing no irregular wear. The external resistance of the box has not been materially increased. The total resistance is 111 ohms, divided as follows: 0.1, 0.2, 0.3, 0.4, 1, 2, 3, 4, 10, 20, 30 and 40 ohms. The coils are guaranteed accurate to 1%.
..... \$10.00
- F4703. RESISTANCE BOX, Standard Design,** for individual student use. We believe this box will be found to be superior to any sold at an equal price. The total resistance is 111 ohms, divided as follows: 0.1, 0.2, 0.3, 0.4, 1, 2, 3, 4, 10, 20, 30 and 40 ohms. The coils are guaranteed accurate to $\frac{1}{2}$ of 1%. For detailed description of construction, see above..... 12.00
- F4704. RESISTANCE BOX,** same as No. F4703, but with guaranteed accuracy, $\frac{1}{6}\%$ 15.00
- F4705. RESISTANCE BOX,** same as No. F4703, but with total resistance of 1,111 ohms, divided as follows: 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400 ohms. Guaranteed accuracy, $\frac{1}{6}\%$ 17.50
- F4711. RESISTANCE BOX, Standard Design,** with traveling plugs. The blocks are of new and improved form, which enables the coils to be held more firmly in position, and lessens the danger of imperfect contact between coils and blocks. The traveling plugs add greatly to the usefulness of the instrument, making it available for the comparison of the E. M. F. of batteries and other tests by the potentiometer method. The total resistance is 1,111 ohms, as follows: 0.1, 0.2, 0.3, 0.4, 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300 and 400. For detailed description of construction see above. Guaranteed accuracy, $\frac{1}{6}\%$ 45.00



No. F4721D.



No. F4713.



No. F4719.

F4713. RESISTANCE BOX, same as No. F4711, but with total resistance 11,110 ohms, as follows: 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000, 2000, 3000 and 4000..... \$45.00

F4719. RESISTANCE BOX, Dial Decade Design. A 3-dial resistance box having a total resistance of 1110 ($=10 \times 1 + 10 \times 10 + 10 \times 100$) ohms, mounted in a mahogany finished hardwood box, with hard rubber top about 15x40 cm. Contact with the blocks at the end of the swinging arm is made by a multiple brush with ends bent so that they are not tangent to the circle in which they move and therefore do not wear rings in the blocks. The coils are of the same description as those used in our other resistance boxes (see page 220), and are guaranteed to $\frac{1}{\%}$ of 1% 45.00

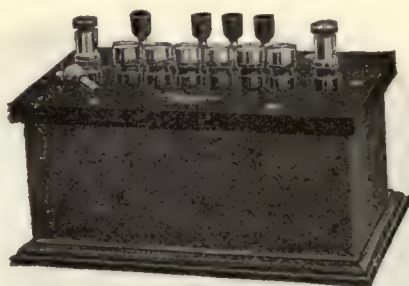
RESISTANCE BOXES, Dial Decade Design. High grade hard rubber top, mounted in a wood case, or, if preferred, in a perforated metal case so that the coils may cool rapidly or be immersed in oil to give extra large current carrying capacity. The dials may be rotated in either direction continuously, the dial switches make thoroughly reliable contact and the brushes are set so that they do not wear rings in the blocks. Guaranteed accuracy 1/10 per cent.

No.	A	B	C	D
No. of dials.....	3	4	4	5
Smallest resistance, ohms.....	10	0.1	1	0.1
Total resistance, ohms.....	11,100	1,111	11,110	11,111

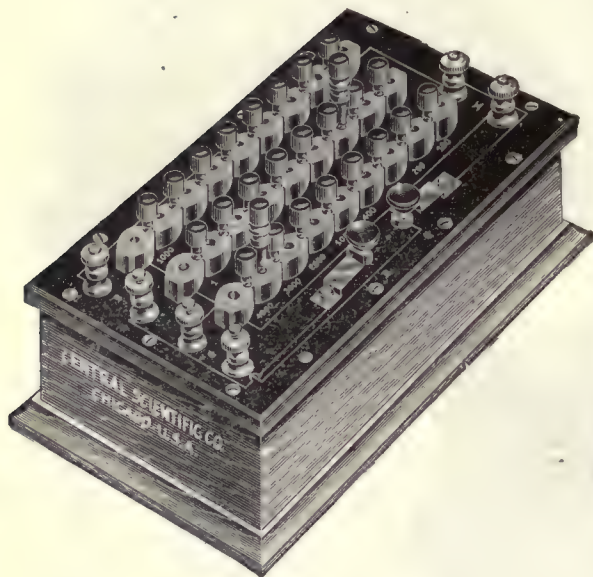
F4721. RESISTANCE BOXES, in wood case..... \$80.65 106.25 106.25 125.00
F4722. RESISTANCE BOXES, in metal case..... 80.65 106.25 106.25 125.00



No. F4739.



No. F4725.



No. F4733.



No. F4731.

F4725. MEGOHM BOX, Standard, with five groups of coils of 200,000 ohms each. Six pillars, well insulated, are used on a hard rubber top, there being 200,000 ohms between each pair of pillars. There is a double contact post on top of each pillar, so that these can be connected together with copper links. In finely finished hardwood box..... \$187.50

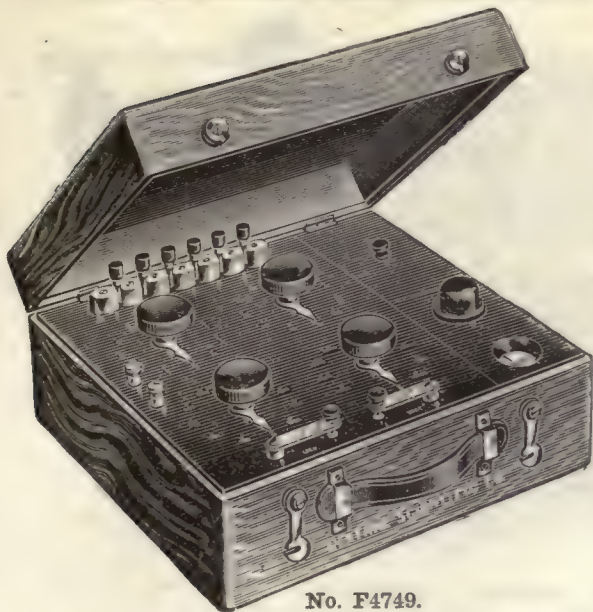
F4727. TENTH-MEGOHM BOX, Standard. In four units of 10,000, 20,000, 20,000 and 50,000 ohms. An infinity plug separates each coil from the one next to it. Segments are insulated by hard rubber above the hard rubber top in order to increase the insulation. In finely finished hardwood box 62.50

WHEATSTONE BRIDGES AND POTENTIOMETERS

F4731. RESISTANCE BOX and WHEATSTONE BRIDGE Combined. Polished hardwood mahogany finished box with hard rubber top $\frac{3}{8}$ -inch thick. Heavy brass blocks of new design (see No. F4711) are used. For other details of construction, see page 220. The bridge coils are six in number, 1, 10 and 100 ohms on each side. The rheostat coils are twelve in number, viz: 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400 ohms. The total range of measurement is therefore from 0.01 to 111,000 ohms. The binding posts for battery, galvanometer, and unknown, and keys with platinum contacts for battery and galvanometer are conveniently placed, and all hidden connections are clearly indicated by lines on the top of the box. Guaranteed accuracy, $\frac{1}{100}$ %. 40.00

F4733. RESISTANCE BOX and WHEATSTONE BRIDGE Combined. An exceptionally high grade box of the finest materials and first class workmanship. The blocks are of new and improved design (see No. F4711), and the other details of construction are as described on page 220. The rheostat coils are sixteen in number, viz: 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000, 2000, 3000, 4000 ohms. The bridge coils are eight in number, 1, 10, 100 and 1000 ohms on each side. The total range of measurement is therefore from 0.001 to 11,110,000 ohms. The binding posts for battery, galvanometer, and unknown, and keys with platinum contacts for battery and galvanometer are conveniently placed, and all hidden connections are clearly indicated by lines on the top of the box. Has two traveling plugs. Guaranteed accuracy, $\frac{1}{100}$ %. 55.00

F4739. BRASS PLUG, with knurled rubber top, as used on our Resistance Boxes..... .25



No. F4749.



No. F4851.



No. F4853.



No. F4861.

DIAL WHEATSTONE BRIDGES.

- F4741. **WHEATSTONE BRIDGE, Dial Decade Design.** Similar in construction to Nos. F4721 Dial Resistance Boxes listed on page 221. Has six ratio coils, one each 1, 10, 100, 100, 1,000 and 10,000 ohms, adjusted to an accuracy of 1/25 per cent. The rheostat has four dials, giving 10x1, 10x10, 10x100 and 10x1,000 ohms, a total of 11,110 ohms, and is adjusted to an accuracy of 1/10 per cent. \$131.25
- F4742. **WHEATSTONE BRIDGE.** Same as No. F4741, but with ten ratio coils, two each 1, 10, 100, 1,000 and 10,000 ohms. 137.50
- F4743. **WHEATSTONE BRIDGE.** Same as No. F4741, but with five dial rheostat, giving 10x0.1, 10x1, 10x10, 10x100 and 10x1,000 ohms, a total of 11,111 ohms. 150.00
- F4744. **WHEATSTONE BRIDGE.** Same as No. F4742, but with five dial rheostat, giving 10x0.1, 10x1, 10x10, 10x100 and 10x1,000 ohms, a total of 11,111 ohms. 156.25
- F4749. **TESTING SET, Portable.** A compact and reliable self-contained instrument, including Wheatstone bridge with rheostat, galvanometer, battery and necessary switches. The ratio arms of the Wheatstone bridge are of the plug type and include four coils in each arm, 1, 10, 100 and 1,000 ohms. The rheostat is of the dial decade type with four dials, units, 10's, 100's and 1,000's, giving a total resistance of 11,110 ohms. The rheostat switches may be revolved continuously in either direction and the contacts are made by multiple brushes, with ends bent so that they are not tangent to the circle in which they move and therefore do not wear rings in the blocks. The contact blocks are on the under side of the plate on which they are mounted, thus insuring a good contact, free from dirt. The galvanometer is of the suspended type and has a sensibility of 1 megohm. With a galvanometer of this type, all trouble experienced on account of the dulling of the pivots as used in old style instruments is entirely obviated. The resistances are the same as used in our Resistance Boxes, described on pages 220-2, and are accurate to 1/10 per cent. The entire set is mounted in a finely finished hardwood case, with leather strap handle for carrying. Complete with directions. 200.00

F4851. **RESISTANCES on Spools.** These resistances are of the same quality used in our Resistance Boxes and are guaranteed to be of the best workmanship. The winding is bifilar on substantial wooden spools, the ends soldered to heavy copper terminals. Accurate to 1/10 of 1%.

Resistance in ohms.....	1	2	5	10	25	50	100	200	500	1000	5000
Each .....	.75	.75	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.00

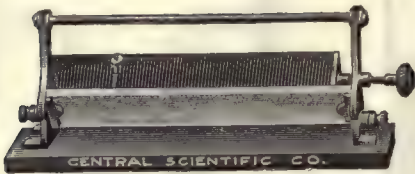
F4853. **RESISTANCE COILS,** mounted in brass case, rubber top, with two binding posts and rubber top brass taper plug for short circuiting the coil. Coils wound bifilar on wooden spools, and guaranteed to an accuracy of 1/10 of 1%.

Resistance in ohms.....	1	2	5	10	25	50	100	200	500	1000	5000
Each	6.00	6.00	.00	6.00	6.50	7.00	7.50	8.00	8.50	9.00	10.00

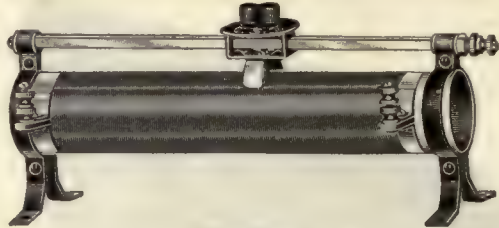
F4861. **STANDARD RESISTANCES, N. B. S.,** as designed by Dr. E. B. Rosa of the Bureau of Standards. (Bulletin B. of Stds., Vol. 5, p. 413.) In these resistances the coil is wound on a metal cylinder and baked in shellac. It is supported by a small tube (closed at the bottom) which serves as a thermometer tube. The leads pass through a hard rubber top which screws into the brass case. The coil is adjusted to the highest precision and the case filled with moisture-free oil and hermetically sealed.

These coils have the following advantages over the old Reichsanstalt form:—(1) They are practically constant. Only one coil out of 28 changed as much as 2 parts in 100,000 in 12 months. (2) They are more compact, the distance between terminals being only 7.5 cm.

Resistance, ohms	1	10	100	1,000	10,000
Each	20.00	20.00	20.00	20.00	25.00



No. 4960.



No. 4964-8.



No. 4990F. Nos. 4990B-E. No. 4990A.

RHEOSTATS

4960. **RHEOSTAT, Carbon**, for use in battery testing, calibrating electrical instruments, photometry, and any experiments in which a **UNIFORM VARIATION** of resistance is desired. Consists of 90 carbon plates 1½ inches square and ¼ inch thick, mounted between castings on a base of asbestos wood so that pressure can be placed on them by a screw, thus allowing a range of resistance of from about 0.1 ohm to 8 ohms or more, including all intermediate values. Safe load for constant duty, 200 watts. A momentary overload of from 500 to 1000 watts may be applied without danger of injury \$15.00

RHEOSTATS, Cenco Laboratory. These new rheostats embody all the excellent features of the rheostats of the Ruhstrat type which we formerly listed for Duty Free importation. Oxidized resistance wire is wound on an enameled metal tube which provides for the more rapid dissipation of heat than the old slate form. The difference of potential between the adjacent turns is so small that the oxide covering of the wire provides sufficient insulation. **The Current Ratings are for Continuous Duty.** Each rheostat is provided with a slider for regulating the amount of resistance in circuit, and with three binding posts, as shown in the illustration, by means of which it may be used as either fixed or variable resistance or as a source of varying potential in a shunt circuit. Specify catalog number and size number in ordering.

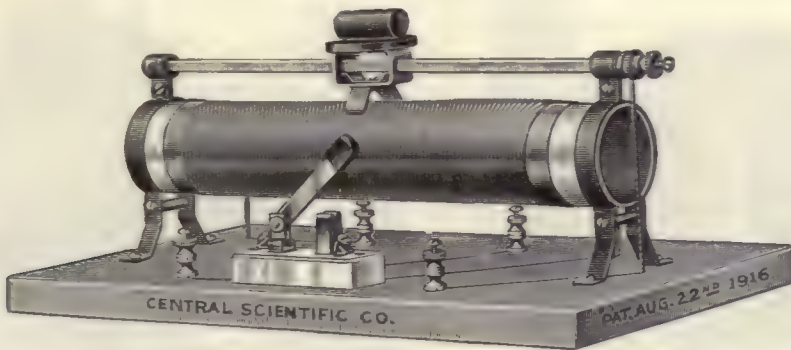
4964. RHEOSTATS. Size of Tube, 2x8 in.									
No.	1	2	4	6	8	16			
Approx. resistance, ohms.....	1700	300	50	25	12	3			
Current capacity, amperes.....	0.5	1	2	3	4	8			
Each	7.50	7.50	7.50	7.50	7.50	7.50			

4966. RHEOSTATS. Size of Tube, 2x12 in.									
No.	1	2	3	4	5	6	8	12	16
Approx. resistance, ohms..	3000	500	175	90	65	40	20	10	5
Current capacity, amperes.	0.5	1	1.5	2	2.5	3	4	6	8
Each	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50

4968. RHEOSTATS. Size of Tube, 2x20 in.									
No.			3	4	6	8			
Approx. resistance, ohms.....			315	160	75	35			
Current capacity, amperes.....			1.5	2	3	4			
Each			10.00	10.00	10.00	10.00			

4990. **RHEOSTATS, National**, tapered (i. e., having the first step of greater current-carrying capacity than the others). These are inexpensive, variable rheostats for use in the laboratory where small current carrying capacities, comparatively small resistances and small wattage consumption are needed. (For rheostats of large resistance, high current capacity and maximum dissipation of energy, see Nos. 4964-4980.) A rolling contact insures long life to the resistance element.

No.	A	B	C	D	E	F
Maximum amperes, first step.....	1	2	3	4	5	6
Ampere capacity, with entire rheostat in circuit	0.5	1	1.5	2	2.5	3
Total resistance, ohms.....	80	40	26.6	20	16	13.3
No. of steps.....	228	250	238	252	252	140
Each	4.35	4.35	4.35	4.35	6.00	7.00



Nos. 4972-8.

RHEOSTATS, Dodge Design, providing a system of wiring whereby a Cenco Rheostat may be connected either in series with the load or as a shunt across the line, the change being made simply by closing a single-throw switch. By means of the slider, the resistance may be varied from zero to the maximum of the rheostat. When connected in series with the load, this variation of the resistances produces a variation in the voltage across the load, the minimum of which is limited by the ratio of the load resistance to the total resistance of the circuit. The current through the load is varied in the same proportion. By this connection it is impossible to obtain very small currents and voltages. By closing the switch and thereby shunting the rheostat across the line, a potentiometer effect is secured by means of which the voltage and current may be varied from zero to a maximum amount, which is the same as the minimum of the series connection. In this manner one secures the full value of the rheostat and in a simple fashion can run the entire range of voltage and current.

OTHER ADVANTAGES OFFERED BY THE DODGE RHEOSTAT.

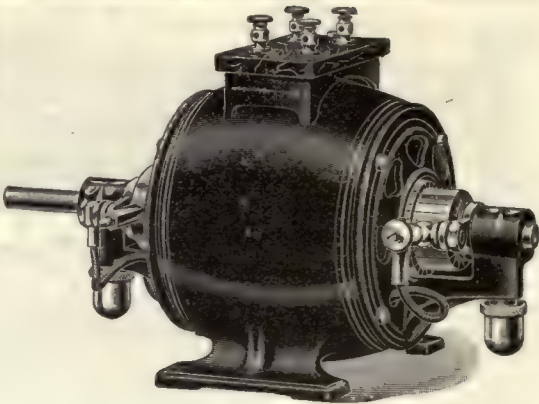
- 1—Substantial mounting upon base of asbestos slate.
- 2—Clear distinction between terminals of load and line.
- 3—Rating of rheostat in maximum current and voltage stamped in plain figures on slider.
- 4—High efficiency. Greatest possible current range for given voltage and size of tube.
- 5—Easy selection of proper capacity. Voltage of source and maximum load current determine the particular rheostat to purchase.

In ordering rheostats of the Dodge design it is necessary to consider only the available voltage and the maximum current required by the load. Those listed first under each catalog number are designed to give the very highest capacity possible within the limits imposed by voltage, length of tube, and a moderate temperature rise, and therefore have the lowest resistance. These rheostats should be ordered unless it is absolutely certain that a higher resistance is needed. For these cases the other sizes are provided, wound with smaller wire, and hence of smaller current carrying capacity. Current rating is for continuous service with moderate temperature rise. Overloads of 50 per cent. and more are permissible on intermittent service.

4972. RHEOSTATS, Dodge Design, Single. For a maximum voltage of 40. Length of tube, 12 inches.				
No.	12	6	4	
Maximum current, amperes.....	6	3	2	
Approximate resistance, ohms.....	10	40	90	
Each	\$12.50	12.50	12.50	
4974. RHEOSTATS, Dodge Design, Single. For a maximum voltage of 110. Length of tube, 12 inches.				
No.	5	4	3	
Maximum current, amperes.....	2.5	2.0	1.5	
Approximate resistance, ohms.....	65	90	175	
Each	12.50	12.50	12.50	
4976. RHEOSTATS, Dodge Design, Single. For maximum voltage of 110. Length of tube, 20 inches.				
No.		8	6	
Maximum current, amperes.....		4	3	
Approximate resistance, ohms.....		35	75	
Each		16.00	16.00	
4978. RHEOSTATS, Dodge Design, Single. For a maximum voltage of 220. Length of tube, 20 inches.				
No.		4	3	
Maximum current, amperes.....		2	1.5	
Approximate resistance, ohms.....		160	315	
Each		16.00	16.00	
4980. RHEOSTATS, Dodge Design, Double. Two tubes in parallel on one base.				
No.	A	B	C	D
Maximum voltage	40	110	110	220
Maximum current, amperes.....	12	5	8	4
Approximate resistance, ohms.....	5	32	17	80
Length of tube, inches.....	12	12	20	20
Each	22.00	22.00	27.50	27.50



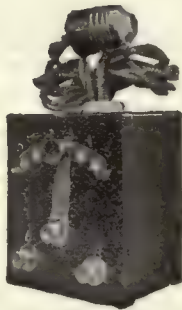
No. 4994.



No. 5002.



No. F3865A.



No. F3867.

4994. **RHEOSTATS, Plate Type**, tapered (i. e., having the first step of greater current-carrying capacity than the others). Of rugged construction, intended for permanent mounting upon wall or switchboard, for use in field regulation of motors or dynamos. They will find many other uses in the laboratory where a permanent rugged rheostat is needed, such as the control of current for electric combustion and muffle furnaces, control of direct current for electrolytic work, etc.

No.	A	B	C	D	E	F
Maximum amperes, first step.....	1	2	4	8	16	20
Ampere capacity, with entire rheostat in circuit	0.5	1	2	4	8	10
Total resistance, ohms.....	150	75	37.5	18.75	9.25	7.5
No. of steps.....	26	26	26	45	120	120
No. of plates in parallel.....	1	1	1	1	2	2
Diameter of plates, inches.....	8	8	8	12	15	15
Each	\$6.50	6.50	6.50	9.50	27.00	27.00

5002. **ROTARY CONVERTERS**, for changing direct to alternating current. Complete with starting box and regulating rheostat.

No.	A	B	C	D
D. C. volts.....	110	220	110	220
D. C. watts, approx.....	160	160	250	250
A. C. volts, approx.....	70	140	70	140
A. C. watts, approx.....	125	125	185	185
Each	47.00	47.00	55.50	55.50

F3865. **TRANSFORMERS, Laboratory**. For use on 110 Volt A. C. Circuits to give alternating currents at from 2 to 28 volts, which will operate all classes of small electric apparatus (A. C. or D. C.), including induction coils, motors and small lamps.

These transformers are indestructible, being enclosed in a steel shell, and operate on 100 to 125 volts, 60 cycles. The windings are embedded in an insulating compound making them impervious to moisture and cementing the entire winding into one solid block.

They are equipped with a new voltage regulator, which eliminates the necessity of a rheostat for controlling the secondary voltages and permits of the voltage being varied in steps of two volts. Voltages 4, 6, 8, 10, 14 and 18 are obtained by connecting to binding posts on the transformer without the use of the voltage regulator and any of these six different voltages can be used simultaneously.

Each transformer is furnished with plug and flexible attachment cord for connecting transformer to line circuit, as well as secondary terminals on the secondary side, and bears a name plate giving complete enumeration of the various voltages obtainable from it.

No.	A	B	C
Capacity, watts	75	100	150
Dimensions, inches	4¼x3¾x3¼	5x4x3¾	5¼x5x4
Weight, lbs.	5	8	11
Each	4.00	5.50	7.50



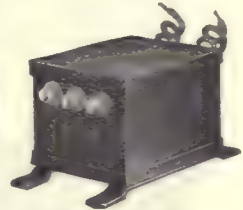
No. F3871.



No. F3873.



No. 5102.



No. F3879B.



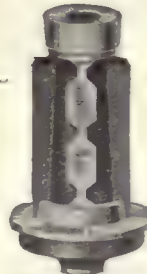
No. 5100.



No. 5106.



No. 5110.

Insert Member
of No. 5110.

No. 5111.



No. F3879D.

F3867. TRANSFORMER, Laboratory. To meet the demand for a transformer of smaller capacity than those listed under No. F3865, there has been developed a transformer of the same general description but smaller and having a voltage regulator giving eleven different voltages in steps of $2\frac{1}{2}$ volts, starting at $2\frac{1}{2}$ and going up to $27\frac{1}{2}$ volts. It is $3\frac{3}{4} \times 3 \times 3$ inches, weighs 3 pounds and is designed for an output of 50 watts. \$3.00

F3871. TRANSFORMERS, Step-up. These Transformers represent the highest type of construction, and are perfect in every detail. Constructed with a magnetic shunt control to protect them from all undue current surges. Designed to connect to any alternating current circuit. No impedance coil or other resistance necessary. Can be used for Wireless Work, Generation of Ozone, Testing Insulation, Electrostatic Separation, High Frequency Experiments, etc.

For operation on voltages ranging between 100 and 125 A. C., 60 cycles. Current regulates as per table below.	No.	A	B	C	D
Kilowatts		$\frac{1}{2}$	$\frac{3}{4}$	1	$2\frac{1}{2}$
Secondary voltage		10,000	10,000	20,000	20,000
Primary amperes		1 to 6	2 to 9	$2\frac{1}{2}$ to 14	6 to 22
Height, inches		9	10	14	18
Width, inches		$4\frac{1}{2}$	5	6	8
Length, inches		9	10	12	14
Weight, lbs.		28	31	46	60
Each		20.00	25.00	30.00	55.00

F3873. TRANSFORMER, Step-up, similar to No. F3871 but without the magnetic shunt; especially adapted to wireless work. Capacity, $\frac{1}{4}$ k.w.; secondary voltage, 8000; size, $9 \times 4\frac{1}{2} \times 6$ inches; weight, 13 lbs. 12.00

F3875. RESISTANCES, Non-Inductive, for use with Nos. F3871-3 connected in shunt across the primary terminals for prevention of inductive kick-backs in the primary circuit. Per pair 1.00

F3879. TRANSFORMERS, Bell Ringing. Designed for ringing bells and buzzers and operating annunciators, burglar-alarm systems and gas lighting systems. They are intended for connection directly to the 110-volt, 60-cycle A. C. mains, are absolutely fireproof and may be short circuited indefinitely without burning them out or impairing their efficiency. Dimensions, $15 \times 10.5 \times 11$ cm.

No.	A	B	C	D
Secondary voltage	6	6-14-20	6-12-18-24	10-25-35
Capacity, watts	60	60	100	100
Weight, lbs.	$7\frac{1}{2}$	$7\frac{1}{2}$	9	9
Each	6.00	7.00	9.00	10.00

ELECTRICAL ACCESSORIES

5100. ATTACHING PLUG, fuseless, Edison, black moulded material with separable cover (No. 5116).35

5102. ATTACHING PLUG for multiple work, porcelain. One end fits any Edison receptacle or socket, and the other is provided with Edison socket for incandescent lamp. At the side is a separable plug (No. 5116) for attaching a lamp cord which will be in multiple with the lamp in the socket75

5103. ATTACHING PLUG for series work. Same as No. 5102 except that the lamp cord will be connected in series with the lamp in the socket.75



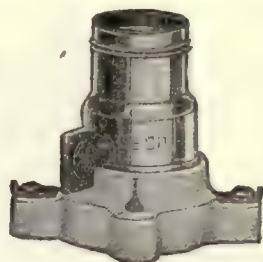
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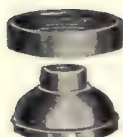
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No. 5116.



No. 5118.



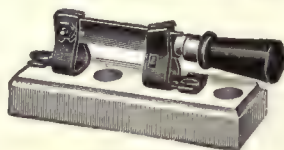
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No. 5120.



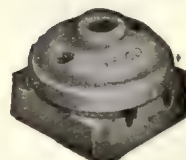
No. 5124.

No. 5128
Shell.

No. F3541.



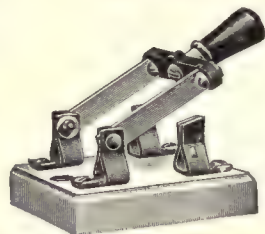
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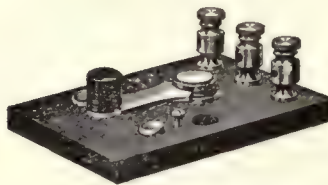
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No. 5130.



No. F3543.



No. F3552.

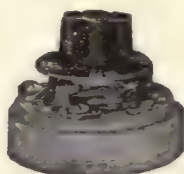


No. F3561.

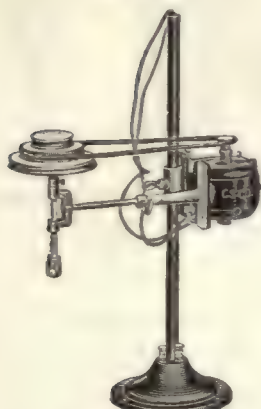
1016. **CUT-OUT, Standard Plug Fuse.** Double pole, Edison sockets, slotted porcelain base, for 125 volts, 30 amperes. Without fuse plugs..... .33
5110. **FUSE PLUG, Edison, renewable,** will hold any No. 5111 Fuse Link. Fuses easily replaced in insert member. No. A B C D E
Carrying capacity, amperes..... 3 6 10 15 30
Each50 .50 .50 .50 .50
5111. **RENEWAL LINKS** for No. 5110..... Per 100 2.00 2.00 2.00 2.00 2.00
For FUSE WIRE see No. 14438.
- F3405. **POLARITY INDICATOR.** Indicates instantly the negative and positive poles when connected in circuit. Size, 2.5x9 cm. Nickel-plated shell which covers and protects the glass tube from injury. For voltages up to 50..... \$2.40
- F3406. **POLARITY INDICATOR.** Same as No. F3405, but for voltages from 50 to 600..... 2.40
- F3409. **POLE-INDICATING PAPER.** When two electrical leads, or terminals, are placed close together upon a piece of the moistened paper, the negative pole shows a red stain. In books of 25 strips, 7x1 cm Per book .10
- For PUSH BUTTONS see Nos. 1198-1200.
5114. **RECEPTACLE,** to take No. 5116 Plug, for open wiring; porcelain..... .30
5116. **PLUG,** for No. 5114 Receptacle, with two finger contacts; black moulded material. Used also on Nos. 5100, 5102 and 5103..... .20
5118. **RECEPTACLE, Key,** for open wiring, Edison; porcelain base, brass shell..... .70
5120. **RECEPTACLE, Keyless,** for open wiring, Edison; porcelain..... .25
5122. **RECEPTACLE, Mounted.** No. 5120 Receptacle mounted on a wood base 10x10 cm, with binding posts. Suitable for use with any Edison base incandescent lamp..... 1.25
5124. **RECEPTACLE, Miniature,** porcelain, for No. 8196 Lamps..... .09
5126. **ROSETTE,** fuseless, for open wiring, for 250 volts or less; porcelain..... .30
5128. **SOCKET,** key, Edison, brass, for use on lamp cord; may also be used on 1/8 inch I. P. size male thread. Of new design, having the two parts of the shell held together by a threaded brass ring, which is readily removed when the socket is to be rewired. (Illustration shows construction clearly)50
5130. **SOCKET,** keyless, Edison, porcelain, with two finger contacts, for use with Nos. 5100, 5102, 5103 and 5114 in place of the separable cover... .. .30
- SPARK COILS, see Induction Coils.**
- F3541. **SWITCH, Knife,** porcelain base, single pole, single throw, 25 amperes. Base about 3x8 cm. .35
- F3542. **SWITCH, Knife,** porcelain base, single pole, double throw, 25 amperes. Base about 3.5x10 cm. .50
- F3543. **SWITCH, Knife,** porcelain base, double pole, single throw, 25 amperes. Base about 5x6.5 cm. .55
- F3544. **SWITCH, Knife,** porcelain base, double pole, double throw, 25 amperes. Base about 6.5x10 cm. .80
- F3551. **SWITCH, Rubber Base,** 1 point, with binding post. Base about 5x7.5 cm..... 1.20



No. 5132.



No. 5134.



No. 5156.



No. 5148.



No. 5140C.

- F3552. **SWITCH**, Rubber Base, 2 point, with binding posts. Base about 5x7.5 cm. \$1.30
 F3553. **SWITCH**, Rubber Base, 4 point, with binding posts. Base about 7.5x7.5 cm. 1.85
 F3561. **SWITCH**, Wood Base, 1 point, about 6.5 cm in diameter15
 F3562. **SWITCH**, Wood Base, 2 point, about 6.5 cm in diameter17
 F3563. **SWITCH**, Wood Base, 4 point, about 6.5 cm in diameter26
 5132. **SWITCH**, Push Through, for use on lamp cord, for 125 volts, 6 amperes or 250 volts, 3 amperes; black moulded material60
 5134. **SWITCH**, Snap, double pole, slotted porcelain base, for 250 volts or less, 10 ampere current. Indicates whether current is on or off. 1.00
 5136. **TAPE**, Insulating, cloth base, $\frac{3}{4}$ inch wide, black, best quality; will not dry out. In quarter pound rolls Per roll .25

TELEPHONE APPARATUS, see Catalog F of Physical Apparatus.

For other **ELECTRICAL APPARATUS**, see Physical Chemistry Apparatus.

5140. **ELECTROLYTIC OUTFIT**, Braun, for the quantitative separation of metals. Extensively used for determining copper by the rotating anode. A complete determination can be made by this method in less than half an hour. The apparatus is equipped with a motor mounted at one side to which a line shaft is attached, from which each unit is driven by a special friction device enabling the operator to use one or more units at one time. The speed is regulated by a rheostat. A separate rheostat controls the current supplied to the individual units, each unit having an individual switch. Revolving anodes and gauze cathodes should be used. The ammeter, line shaft, bearings, switches, etc., are all enclosed in glass to prevent coming in contact with acid fumes. The lower portion of the cabinet is covered with aluminum and the binding posts are also made of this material.

Direct Current is necessary and where Alternating Current only is obtainable a Motor-Generator Set should be obtained. (See Nos. 4824 to 4848.)

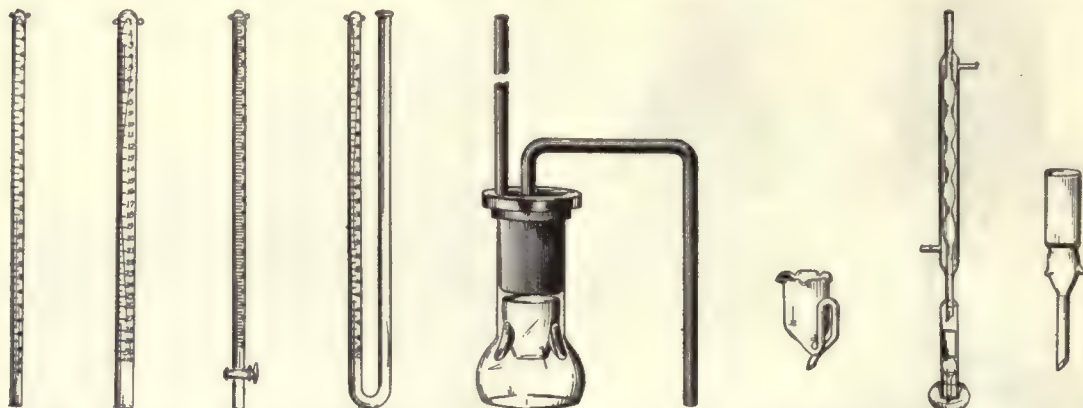
Complete with ammeter, rheostats for motor and units, and stands for breakers, with instructions for mounting and operating. Without platinum electrodes.

No.	A	B	C
Number of units.....	2	4	6
Each	125.00	175.00	225.00

For **PLATINUM ELECTRODES**, see general heading **Platinum Ware**.

5148. **ELECTROLYTIC SUPPORT**, with glass rod mounted on japanned iron tripod base, ring for dish with three platinum contact points and clamp for anode. Binding posts are provided on both ring and clamp. Height of rod, 11 $\frac{1}{2}$ inches; diameter of ring, 2 $\frac{1}{4}$ inches. 4.50
 5150. **ELECTROLYTIC SUPPORT**, same as No. 5148, but with two clamps with binding posts 4.50
 5156. **ELECTRIC ROTATOR** for Anodes, with motor, adjustable bracket, spindle with chuck for holding anode, and three step pulley. Complete with rheostat for controlling the speed.

No.	A	B	C	D
	A.C.		D.C.	
For volts	110	220	110	220
Each	27.50	31.50	27.50	31.50



No. 5168. No. 5170. No. 5172. No. 5174.

No. 5180.

No. 5183.

No. 5188. No. 5191.

EMERGENCY KIT, see First Aid Cabinet.**5160. EMERY CLOTH, in sheets 9x11 inches.**

No.	000	00	0	1	2
Per sheet.....	\$0.10	.10	.10	.15	.15
Per quire.....	2.00	2.00	2.00	2.25	2.50

5162. EMERY PAPER, in sheets 9x11 inches.

No.	000	00	0	1
Per sheet.....	.06	.06	.06	.06
Per quire.....	1.20	1.20	1.20	1.20

5168. EUDIOMETERS, Bunsen's, with platinum electrodes.

Capacity, cc.....	50	100
Graduated in, cc.....	1/10	1/5
Each	2.00	2.80

5170. EUDIOMETERS, Bunsen's, with platinum electrodes; graduated in mm.

Length of graduation, mm.....	300	500
Each	2.20	2.80

EUDIOMETER, Hoffman's, see Lecture Apparatus.**5172. EUDIOMETERS, Mitscherlich's, with glass stop-cock and platinum electrodes.**

Capacity, cc.....	50	100
Graduated in, cc.....	1/5	1/5
Each	3.70	4.20

5174. EUDIOMETERS, Ure's, U form, with platinum electrodes, 50 cc; graduated in 1/4ths..... 3.00**EXTRACTION APPARATUS****5180. EXTRACTION APPARATUS, Bailey-Walker, consisting of a metal condenser, small glass flask of special shape, and a small glass siphon cup. This is one of the most compact forms of extraction apparatus and can be used for any kind of work. The flask is light and can be accurately weighed and easily cleaned. Made according to the design of Bailey and Walker, of the Bureau of Chemistry, United States Department of Agriculture. (See Journal of Industrial & Engineering Chemistry, Vol. VI, No. 6, for June 1914, page 497)..... 5.00****5181. CONDENSER only of No. 5180..... 3.50****5182. FLASK only of No. 5180..... .60****5183. SIPHON CUP only of No. 5180..... .65****5184. GOOCH CRUCIBLE, Porcelain, 25 cc, with holes for suspension; for use with No. 5180, for percolation method40****5185. GLASS CONDENSER for No. 5180, of compact form, for use when desirable to avoid contact of metal with the solvent 1.00****5188. EXTRACTION APPARATUS, Knorr's, original form, consisting of a No. 5654 Flask, 100 cc, for mercury seal, No. 5189 Condenser and No. 5191 Extraction Tube..... 8.50****5189. CONDENSER only of No. 5188 with adapter sealed on..... 3.00****5654. EXTRACTION FLASK only of No. 5188, Knorr's original form, for mercury seal. Capacity, 100 cc..... .50****5191. EXTRACTION TUBE only of No. 5188, Knorr's original form, with perforated platinum disk sealed in and three glass projections to allow escape of ether vapor from the flask..... 5.00**



No. 5197. No. 5204. No. 5206. No. 5212. No. 5213. No. 5214. No. 5216.

5194. **EXTRACTION APPARATUS**, Knorr's, modified by Walter & Goodrich. Complete with Condenser No. 5189, extraction tube, perforated nickel lower disk and flask for mercury seal with holes for ether return, but without spring or upper perforated disk. (See Circular No. 69, Bureau of Chemistry, United States Department of Agriculture)..... \$4.35

Extra Parts for No. 5194.

5197. **EXTRACTION TUBE**, improved form, without projections or sealed in disk. Without wire spring or disk45
5198. **SPRING** for No. 5197 to press sample against lower disk..... .25
5199. **DISK**, upper, for No. 5197, of nickel..... .30
5200. **DISK**, upper, for No. 5197, of platinum..... at market price
5201. **DISK**, lower, for No. 5197, of nickel..... .40
5202. **DISK**, lower, for No. 5197, of platinum..... at market price
5656. **EXTRACTION FLASK**, improved form, same as No. 5654, but with two holes in neck for return flow of ether..... .50
5204. **EXTRACTION APPARATUS**, Reed's, of polished copper, for bark and wood extracts. Widely used in tanning laboratories. Complete with Soxhlet spherical condenser..... 33.00
5206. **EXTRACTION APPARATUS** for Rubber Insulating Material, as recommended by the Joint Rubber Insulation Committee. Consists of a glass flask of special size with condenser of the Cottle or Underwriters' form and glass siphon cup, made according to the exact specifications of the Committee. (See Journal of Industrial and Engineering Chemistry, Volume IX, No. 3, for March 1917, page 310)..... 3.30
5207. **CONDENSER** only of No. 5206..... 2.25
5209. **FLASK** only of No. 5206, of Pyrex Glass..... .35
5210. **SIPHON CUP** only of No. 5206..... .70
5212. **EXTRACTION APPARATUS**, Soxhlet's, complete with No. 5646 Flask, No. 5213 Extraction Tube and No. 5215 Allihn's Condenser, fitted with fine grained cork stoppers for connection.
- | No. | A | B | C |
|---|-------|-------|--------|
| Capacity to top of siphon, cc..... | 60 | 100 | 200 |
| Height of siphon tube, mm..... | 100 | 110 | 120 |
| Approximate inside diameter, mm..... | 30 | 38 | 50 |
| Suitable for extraction thimbles, mm..... | 80x22 | 80x33 | 123x43 |
| Length of condenser jacket, inches..... | 6 | 8 | 10 |
| Size of flask, cc..... | 125 | 175 | 250 |
| Each..... | 3.25 | 3.60 | 4.50 |
5213. **EXTRACTION TUBES** only of No. 5212..... 1.50 2.00 2.80
5214. **EXTRACTION TUBES** only for No. 5212, especially designed for analysis of Cottonseed Oil, to take Extraction Thimbles No. 5248, 80x22 mm.
- | No. | A | B |
|--------------------------------|------|------|
| Length of siphon tube, mm..... | 25 | 45 |
| Each..... | 1.50 | 2.00 |
5215. **CONDENSERS** only of No. 5212..... Each 1.10 1.30 1.80
- CONDENSERS, Soxhlet's, for use with No. 5212, see No. 3234.
5646. **EXTRACTION FLASKS** only of No. 5212.
- | | | | | |
|---------------------------------------|-----|-----|-----|-----|
| Capacity, cc..... | 60 | 125 | 175 | 250 |
| Approximate diameter of neck, mm..... | 31 | 35 | 40 | 43 |
| To take rubber stopper, No..... | 7 | 7 | 8 | 9 |
| Each..... | .11 | .13 | .17 | .21 |
- For other **EXTRACTION FLASKS**, see **Flasks, Extraction**.
5216. **EXTRACTION APPARATUS**, Soxhlet's, similar to No. 5212, but with all joints ground. Complete with three flasks ground to fit extraction tube.
- | No. | A | B | C |
|------------------------------------|------|------|-------|
| Capacity to top of siphon, cc..... | 60 | 100 | 200 |
| Each..... | 8.50 | 9.60 | 10.50 |



No. 5218.



No. 5222.



No. 5226.



No. 5232.



No. 5238.



No. 5244.

5218. **EXTRACTION APPARATUS**, Soxhlet's, with Hopkins Inner Cooled Condenser ground to fit into Soxhlet extraction tube, with Knorr flask for mercury seal, preventing any leak of ether vapor.

No.	A	B	C
Capacity, to top of siphon, cc.....	60	100	200
Approximate inside diameter of extraction tube, mm.....	30	38	50
Each	\$7.00	8.00	9.00

5220. **EXTRACTION APPARATUS**, same as No. 5218, but with Sy's flask for mercury seal in place of Knorr's.

No.	A	B
Capacity, to top of siphon, cc.....	60	100
Each	7.25	8.50

5222. **EXTRACTION APPARATUS**, Teas', for the extraction of tanning materials, as used by the Association of Official Agricultural Chemists. Consists of a heavy copper flask of one liter capacity, fitted with ground in copper extractor lined with tin, and a tin lined copper Soxhlet condenser. A side tube is provided for removal of percolate and for flooding the contents of the extraction tube. Height, 18 inches; diameter of flask, 7 inches..... 23.50
CONDENSER only of No. 5222, see No. 3234.

5223. **EXTRACTION TUBE** only of No. 5222. Can be used with any 750 cc Erlenmeyer flask... 16.50

5226. **EXTRACTION APPARATUS**, Underwriters' Laboratories Improved Form, with glass siphon cup. (See "Standards for Rubber Covered Wires and Cables," 1915)..... 3.30

5227. **CONDENSER** only of No. 5226..... 2.25

5228. **EXTRACTION FLASK** only of No. 5226..... .35

5229. **SIPHON CUP** only of No. 5226..... .70

5232. **EXTRACTION APPARATUS**, Wiley's, consisting of nickel-plated copper condenser, tin lined, special form, with suspended porcelain Gooch crucible, arranged to fit into straight glass tube with ground flange, rendering the use of stoppers unnecessary. Both residue and extracted matter may be easily weighed..... 6.50

5233. **CONDENSER** only of No. 5232..... 5.35

5235. **GLASS TUBE** only of No. 5232, of Pyrex glass75

5184. **GOOCH CRUCIBLE** only of No. 5232, with holes for suspension..... .40

5238. **EXTRACTION APPARATUS**, Wiley's, Modified by Richardson, with glass siphon cup. Especially adapted for extraction of tankage, cotton-seed meal, meat, soap, etc. (See Journal of Industrial and Engineering Chemistry, Vol. IV, No. 3, for March 1912, page 221)..... 6.80

5239. **GLASS SIPHON CUP** only of No. 5238..... .70

5240. **GLASS TUBE** only of No. 5238..... .75

CONDENSER only of No. 5238, see No. 5233.

5241. **PERFORATED GLASS CUP**, to be used with No. 5238, in place of siphon cup for percolation purposes..... .60

EXTRACTION FLASKS, see Flasks, Extraction.

5244. **EXTRACTION THIMBLES**, Alundum, for the extraction of soaps, fats, food, rubber, etc., by both organic and inorganic solvents. Very rapid, practically indestructible and readily cleaned by ignition. Medium porosity carried in stock. Fine and coarse porosities can be supplied on short notice. Thickness of wall, approximately 1 mm.

No.	flat bottom			round bottom	
	A	B	C	D	E
Length, mm.....	55	70	90	100	127
Diameter, mm.....	35	25	19	34	45
Each .....	.50	.45	.50	.60	1.00



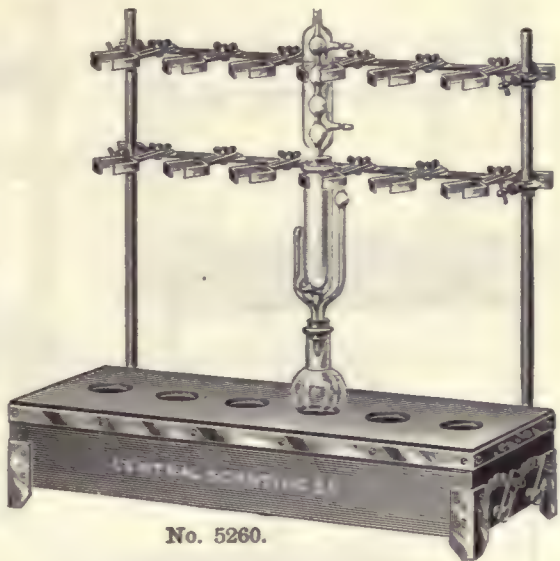
No. 5246.



No. 5254.



No. 5248.



No. 5260.

5246. **EXTRACTION THIMBLES, Glass**, with round perforated bottoms. Easily cleaned, may be used repeatedly and exact weight determined.

No.	A	B
Length, mm.....	80	80
Diameter, mm.....	22	33
Each	\$0.45	.65

5248. **EXTRACTION THIMBLES, Whatman's Seamless**, made from the same material as the Whatman Filter Papers and rendered fat-free by a special chemical process. Can be used repeatedly.

No.	A	B	C
Length, mm.....	80	80	123
Diameter, mm.....	22	33	43
Per box of 25.....	3.15	3.55	7.10

5254. **EXTRACTION TUBE, Roehrig's**, for use in determining fat in milk and dairy products by the Roese-Gottlieb Official Method of the Association of Official Agricultural Chemists. Graduated to 80 cc in 1 cc divisions with side tube and stop-cock for withdrawing solvent. Complete with ground glass stopper, on wooden base. (See Leach "Food Inspection and Analysis," page 200)

4.50

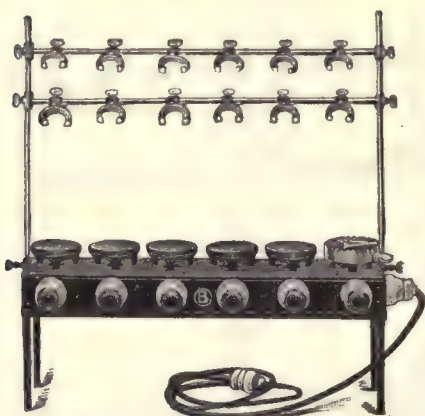
EXTRACTION APPARATUS HEATERS

5260. **EXTRACTION APPARATUS HEATER, Cenco Electric**, designed by W. H. Ross, consisting of a box of asbestos board 80x20x12 cm, containing a series of resistance coils over which is supported a sheet iron pan. The top of the box is removable and has openings for flasks which rest upon the bottom of the iron pan. By this method the flasks rest upon a hot plate and are surrounded by hot air, thus requiring a minimum current. By means of a single switch arrangement, currents from 1 to 4 amperes at 110 volts, in 9 steps, may be obtained, giving a wide range of temperature for solvents at various boiling points. This may be used as an ordinary hot plate by removing the top, or as a liquid bath by using water in the iron box. The supports are adjustable in height with clamps for each extractor and condenser. Complete with covers for holes

60.00

5262. **EXTRACTION APPARATUS HEATERS, Electric**, similar in general construction to No. 5260, but provided with six electric lamps instead of the system of heating coils, and without the iron tray.

No.	A	B
For volts	110	220
Each	47.50	48.50



No. 5264.



No. 5270.



No. 5278.
No. 5286.



No. 5280.
No. 5288.



No. 5282.



No. 5272.

5264. **EXTRACTION APPARATUS HEATERS, Electric**, similar to No. 5262, but with individual hot plates for the different flasks. As each hot plate has its own switch, any one or all may be used at one time, as desired. Length, 24 inches; width, 5½ inches; height to top of hot plate, 9 inches; diameter of hot plates, 3¼ inches. With six hot plates.

No.	A	B
For volts	110	220
Each	\$72.50	72.50

5270. **EXTRACTION APPARATUS HEATER**, consisting of rectangular water bath of tinned copper with 6 openings 2½ inches in diameter, and with constant water level, on substantial support. Fitted with uprights at ends and adjustable supporting racks for extractors. Length, 23 inches; width, 4½ inches; depth, 4 inches; height (not including uprights), 11 inches; height over all, 31 inches. Without glassware or burner. 25.00

5272. **EXTRACTION APPARATUS HEATER**, consisting of a circular water bath with six 2½ inch openings fitted with concentric rings, and with constant water level, on tripod support stand. A support rod with two adjustable arms is provided, equipped with spring clamps for six extractors. Diameter of water bath, 12 inches; depth, 4½ inches; height of top of water bath from table, 10½ inches; total length of support rod, 31½ inches. Complete with adjustable ring burner for illuminating gas. 29.50

HOT PLATES, Electric, for extraction apparatus, see general heading **Hot Plates, Electric**.

FAUCET CONNECTIONS, see **Hose Connections**.

5278. **FERMENTATION TUBES, Smith's**, on glass foot.

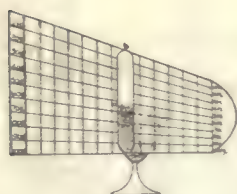
No.	A	B
Length of closed tube, mm.	115	140
Diameter of closed tube, mm.	12	15
Each	.30	.35

5280. **FERMENTATION TUBES, Smith's**, without glass foot.

No.	A	B
Length of closed tube, mm.	115	140
Diameter of closed tube, mm.	12	15
Each	.20	.25

5282. **FERMENTATION TUBES**, same as No. 5280, but without bulb.

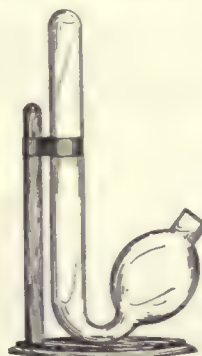
No.	A	B
Length of closed tube, mm.	125	175
Diameter of closed tube, mm.	12	15
Each	.15	.20



No. 5284.



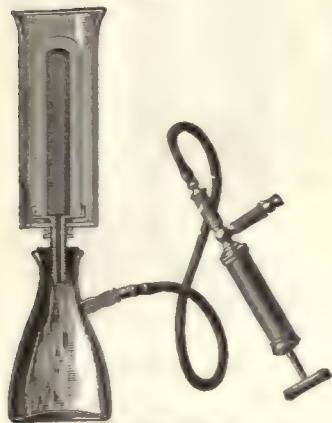
No. 5292.



No. 5290.



No. 5312.



Nos. 5314-16.



No. 5296.



No. 5298.

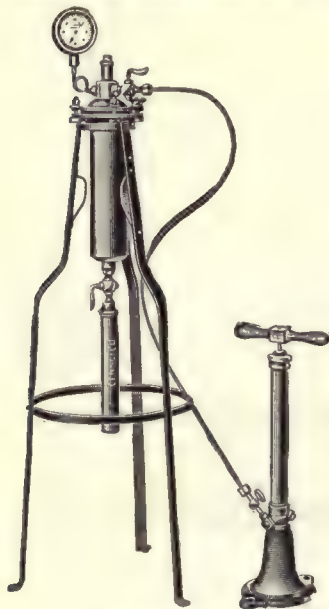


No. 5300.

5284.	CHART, Frost's Gasometer, for measuring gas in fermentation tubes.....	\$0.10
5286.	FERMENTATION TUBE, Standard, as adopted by the American Public Health Association. Length of closed tube, 140 mm; diameter of tube, 15 mm; diameter of bulb, 38 mm. On glass foot. (See "Standard Methods of Water Analysis," 1915, page 137).....	.50
5288.	FERMENTATION TUBE, Standard, same as No. 5286, but without glass foot.....	.35
5290.	FERMENTATION TUBE SUPPORT for single tubes. Of wood with brass clip for holding tubes.....	1.00
5292.	FERMENTATION TUBE SUPPORT, of metal, for holding 10 fermentation tubes. Can also be used for test tubes, ureometers, and any tubes not less than 5 inches long.....	1.60
	FIGURES, Steel, see Dies No. 3820.	
5296.	FILES, Rat Tail, bastard cut. Length of cut portion, inches.....	4 5 6 8
	Each.....	.14 .16 .18 .20
5298.	FILES, Triangular, slim tapers, single cut, for use in the laboratory for cutting glass tubing. Length of cut portion, inches.....	3 4 5 6 8
	Each.....	.08 .10 .12 .14 .22
5300.	FILES, Half Round, bastard cut. Length of cut portion, inches.....	8 10
	Each.....	.50 .62
5302.	FILES, Half Round, cabinet wood rasps. Length of cut portion, inches.....	8 10
	Each.....	.84 1.04
5306.	FILE HANDLES, soft wood with ferrule. Diameter, inches.....	1 1 1/4 1 1/4
	Each.....	.03 .03 .03
	Per dozen.....	.30 .30 .30

FILTERING APPARATUS

5312.	FILTERING APPARATUS , consisting of Glass Bell Jar No. 1162, with heavy glass plate ground to make air tight seal, two-hole rubber stopper, 2½ inch funnel, and L tube.						
No.			A	B			
Size of bell jar, inches.....			5x9	6½x11			
Size of glass plate, inches.....			6x6	8x8			
Each			4.50	5.00			
5314.	FILTERING APPARATUS, Berkefeld Type , consisting of a porous cylinder fitted with metal head piece and outlet tube, and provided with glass mantle for holding liquids. Extensively used for sterilizing liquids of all kinds, filtering serums, toxins, etc., and in separating bacteria from cultures. They should be used in connection with Filter Flasks, No. 5664, attached to a filter pump or other means of exhausting air. Without flask or pump.						
No.	A	B	C	D	E	F	
Height of cylinder, inches.....	1¾	2½	5	8	8	10	
Diameter of cylinder, inches.....	¾	¾	1	1¼	1½	2	
Each	1.65	2.00	3.50	4.25	4.40	5.25	



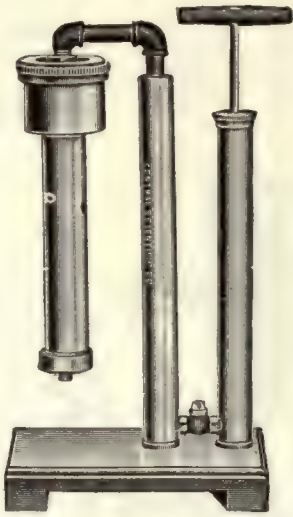
No. 5318.



Nos. 5320-6.

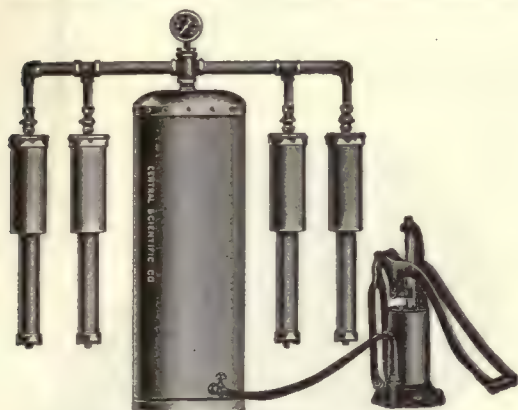


Nos. 5320-6.
(Cross-section.)



Nos. 5328-30.

5315. **FILTERING CYLINDERS** only of No. 5314.
- | | | | | | | |
|------------|--------|------|------|------|------|------|
| No. | A | B | C | D | E | F |
| Each | \$1.15 | 1.25 | 2.50 | 3.00 | 3.15 | 3.50 |
5316. **GLASS MANTLES** only of No. 5314.
- | | | | | | |
|-----------------------|--------|-----|-------|-------|------|
| No. | A | B | C | D | E |
| Size, inches..... | 2½x7⁄8 | 4x1 | 5¾x2½ | 11x2½ | 14x4 |
| For cylinder, No..... | A | B | C | D & E | F |
| Each | .50 | .75 | 1.00 | 1.25 | 1.75 |
5318. **FILTERING APPARATUS**, for Serums, for pressure filtration. The outfit consists of a cast iron reservoir enameled inside, to which is attached the filter chamber, containing the porous tube or bougie. A stop-cock is provided in the connecting tube between the reservoir and filter chamber. Diameter of reservoir, 3¾ inches; depth of reservoir, 12 inches; height of apparatus over all, 46 inches; floor space occupied, 18x18 inches. Complete with pressure gage, pump, connecting tubing and stand as shown in illustration..... 125.00
5319. **FILTER TUBE** only of No. 5318. Length over all, 8½ inches; width at base, 1⅝ inches; width at top 7⁄8 inch..... 1.95
5320. **FILTERING APPARATUS** for Soils, Brigg's Design, as described in Bulletin No. 31 of the Bureau of Soils. Extensively used in the filtration of soil solutions. Can be used in filtering any solution under pressure where a clear filtrate is desired. Consists of a cylinder of brass nickel-plated on the outside and heavily plated with silver inside, fitted with a Pasteur-Chamberland filter tube of unglazed porcelain. Capacity of reservoir, approximately 800 cc 16.00
5322. **FILTERING APPARATUS** for Serums, Brigg's Design, same as No. 5320, but with special bougie for serum filtration..... 16.00
5324. **FILTERING APPARATUS** for Soils, Brigg's Design, similar to No. 5320, but of iron, porcelain lined. Capacity of reservoir, approximately 750 cc. Complete with Pasteur-Chamberland Filter Tube 13.00
5326. **FILTERING APPARATUS** for Serums, Brigg's Design, same as No. 5324, but with special bougie for serum filtration..... 13.00
5328. **FILTERING APPARATUS** for Soils, Brigg's Design, similar to No. 5320, but complete with air pump and tank mounted on a substantial base. This makes a very convenient outfit for field use in soil investigations. Capacity of reservoir, about 250 cc. Complete as illustrated 30.00
5330. **FILTERING APPARATUS** for Serums, Brigg's Design, same as No. 5328, but with special bougie for serum filtration..... 30.00



Nos. 5332-8.



No. 5348.



No. 5346.



No. 5352.

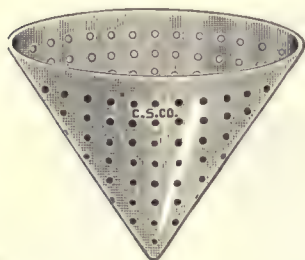


No. 5354.



No. 5356.

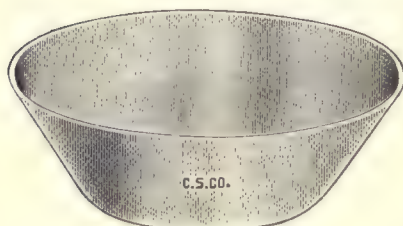
5332. **FILTERING APPARATUS for Soils, Brigg's Design**, consisting of four No. 5320 Filters, mounted as shown, complete with air reservoir of 10 gallons capacity, pressure gage and special compression pump. \$100.00
5334. **FILTERING APPARATUS for Serums, Brigg's Design**, same as No. 5332, but with special bougies for serum filtration. 100.00
5336. **FILTERING APPARATUS for Soils, Brigg's Design**, same as No. 5332, but with four porcelain lined Filters No. 5324. 88.00
5338. **FILTERING APPARATUS for Serums, Brigg's Design**, same as No. 5336, but with special bougies for serum filtration. 88.00
5340. **FILTER TUBE**, for Soils, Pasteur-Chamberland, French make, for use with Nos. 5320, 5324, 5328, 5332, and 5336. Length over all, 10 inches; diameter of unglazed cylinder, 1 inch 2.00
5342. **FILTER TUBE (Bougie)**, for Serums, Pasteur-Chamberland, French make, for use with Nos. 5322, 5326, 5330, 5334 and 5338. 2.00
5346. **FILTERING APPARATUS, Fitzgerald's Constant Level**, consisting of a 300 cc glass reservoir, having a long glass rod fitted with a ground stopper for closing the lower opening when filling the apparatus. The liquid to be filtered is introduced through the opening at the side 2.25
5348. **FILTERING APPARATUS, Tray Form**, consisting of glass tray with ribbed bottom and outlet at one corner. The entire surface of the filter paper is utilized, affording four times as much filtering surface from the same sheet as in a funnel. Takes filter paper 12x12 inches. Widely used for separating liquids from impurities where the weight of the separated material is not needed. Complete with supporting tripod as shown. 4.50
5349. **FILTER PAPER** for No. 5348 Filtering Apparatus, in sheets 12x12 inches.
- A. For rapid filtration. per 100 sheets 3.20
- B. Heavy paper for finer work. per 100 sheets 6.00
5352. **FILTER BAGS** of felt.
- Capacity, quarts 1 2 4
- Each 2.00 2.25 2.75
5354. **FILTER BALLOON**, Pukal, of unglazed porcelain, for filtering solutions from outside by means of a filter pump. Height, 200 mm; diameter, 125 mm; capacity, about 400 cc. 1.65
5356. **FILTER BOUGIES**, see Filter Tubes Nos. 5340 and 5342.
5356. **FILTER CONES**, Alundum, for rapid filtration by suction, for use in any 60° funnel, to which they are attached by a wide band of rubber tubing. They have a large filtering area and can be completely washed free from all soluble salts, as the entire filtering area is within the funnel. They may be completely cleansed by reverse washing and ignition, and used repeatedly. Complete with wire stand for support when not in use. Medium porosity only carried in stock. Fine and coarse porosities can be supplied on short notice.
- | No. | A | B | C | D |
|-----------------------|--------|-------|--------|-------|
| Capacity, cc. | 20 | 50 | 60 | 100 |
| Diameter, inches | 1 3/4 | 2 1/2 | 3 | 4 1/2 |
| Height, inches | 1 5/16 | 1 7/8 | 2 7/16 | 3 1/2 |
| Each | .30 | .35 | .40 | .50 |
5357. **RUBBER GASKETS** for use with No. 5356. No.
- | For filter cone, cc. | A | B | C | D |
|---------------------------|-----|-----|-----|-----|
| Each | .05 | .05 | .08 | .10 |



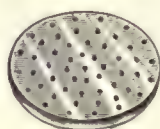
No. 5360.



No. 5362.



No. 5368.



No. 5366.



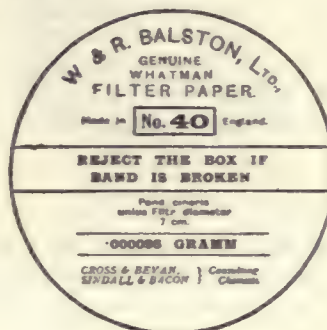
No. 5380.

5360. **FILTER CONE**, Best American Porcelain, glazed throughout except rim, with holes about 1 mm in diameter.
- | | | |
|--------------------------|--------|------|
| No. | 3 | 4 |
| Diameter, mm. | 50 | 63 |
| Length of side, mm. | 43 | 58 |
| Each | \$0.90 | 1.10 |
5362. **FILTER CYLINDER**, Best American Porcelain, unglazed, with flange, for filtering solutions by means of a filter flask. Length, 115 mm; diameter inside, 16 mm; diameter outside, 20 mm; diameter of flange, 50 mm.80
5366. **FILTER DISKS**, Perforated, Best American Porcelain, with beveled edge.
- | | | | |
|--------------------|-----|-----|-----|
| Diameter, mm. | 25 | 38 | 50 |
| Each | .20 | .30 | .38 |
5368. **FILTER DISHES**, Alundum, to fit the top of a glass funnel for rapidly filtering large amounts of material. Especially adapted for organic work. Filters thoroughly, quickly and without previous preparation. Medium porosity carried in stock. Fine and coarse porosities can be supplied on short notice.
- | | | | |
|-----------------------|------|------|-----|
| No. | A | B | C |
| Diameter, inches | 5½ | 4 | 2½ |
| Depth, inches. | 2 | 2 | 1 |
| Capacity, cc. | 400 | 300 | 50 |
| Each | 1.50 | 1.00 | .40 |
5369. **RUBBER GASKET**, molded shape, for No. 5368A, 400 cc.50
- FILTER FLASKS**, see No. 5664.

FILTER PAPER

5380. **FILTER PAPER** for qualitative work. A pure white paper of superior quality, strong and rapid. Cut in round filters, 100 in a package.
- | | | | | | | | | | | | |
|---------------------------------|-----|-----|-----|------|-----|-----|-----|------|------|------|------|
| Diameter, cm. | 7.5 | 10 | 11 | 12.5 | 15 | 20 | 25 | 33 | 40 | 45 | 50 |
| Per package of 100 sheets. | .18 | .21 | .23 | .27 | .35 | .55 | .88 | 1.26 | 1.48 | 1.85 | 2.20 |
5381. **FILTER PAPER**, same quality as No. 5380, in sheets 20x20 inches.
- | | |
|-----------------|-------|
| Per quire. | .80 |
| Per ream. | 12.20 |
5398. **FILTER PAPER**, J. Green for Agar Agar, similar to Chardin. The filters are folded and packed in boxes.
- | | | |
|---------------------|------|------|
| Diameter, cm. | 34 | 50 |
| Number in box. | 30 | 25 |
| Per box | 3.25 | 3.25 |
5400. **FILTER PAPER**, J. Green No. 588 (S. & S. No. 588), Folded, excellent quality, free from chlorine, folded in such a way as to protect the points from tearing. In boxes of 100 filters.
- | | | | | |
|----------------------|------|------|------|------|
| Diameter, cm. | 12.5 | 15 | 18.5 | 24 |
| Per box of 100. | 1.00 | 1.20 | 1.50 | 2.00 |

WHATMAN FILTER PAPER



WHATMAN FILTER PAPERS have been developed by Messrs. W. & R. Balston, Ltd., of England, the manufacturers of the well known **Whatman Drawing Paper**. Working in consultation with **Cross and Bevan**, the cellulose experts, they have succeeded in perfecting a complete line of these papers, which have been acknowledged to be equal in **quality, finish, and service** to any previously on the market. These papers come packed in well-made carboard boxes, carefully labelled and sealed to prevent handling, each box containing 100 circles.

The grades listed below offer an assortment from which one may select a paper suitable to any type of precise analytical work. In order to give an idea of the work for which each grade is best suited, we give the number of the Schleicher & Schuell, Dreverhoff or Munktell paper to which it most closely corresponds.

QUANTITY PRICES.

By agreement with the manufacturers we are permitted to offer the following discounts upon Whatman Filter Papers when purchased in quantities:

Upon orders amounting to less than \$100.00 list	Net.
Upon orders from \$100.00 to \$200.00 list.....	5%
Upon orders above \$200.00.....	10%

(Orders may be assorted as to kinds and sizes, but must be placed at one time.)

5410. **FILTER PAPER, Whatman No. 1 (S. & S. No. 595)**, a high grade rapid filter paper for general qualitative work and for filtering ordinary precipitates when the ash weight of the paper is of no consequence. Widely used in Sugar Laboratories and for the filtration of yellow Ammonium Phospho-Molybdate after digestion, in determining phosphorus in fertilizers.

Diameter, cm.	7	9	11	12.5	15	18.5	24
Ash weight per circle, grams.....	.00046	.00076	.0011	.0016	.0021	.0032	.0054
Per 100 circles.....	\$0.20	.24	.28	.37	.51	.71	1.25

FILTER PAPER, Whatman No. 1 (S. & S. No. 595), same as No. 5410, but in sheets, 46.5 x 57 cm.

5411. Per 100 sheets.....	4.45
5412. Per ream (500 sheets).....	20.25

5414. **FILTER PAPER, Whatman No. 2 (S. & S. No. 597)**, a qualitative paper similar to No. 1, but stouter, retaining fine precipitates. This is the **standard grade for analytical purposes**. Widely used in the qualitative analysis of the alkaline earths, and in general where fine precipitates of crystalline nature are to be filtered. Especially applicable to Fertilizer, Cement, Steel, and Ore Analysis.

Diameter, cm.	7	9	11	12.5	15	18.5	24
Ash weight per circle, grams.....	.0007	.0012	.0018	.0024	.0034	.0052	.0089
Per 100 circles.....	.27	.34	.42	.52	.74	1.04	1.78

5416. **FILTER PAPER, Whatman No. 3 (S. & S. No. 598)**, a very stout filter paper for general qualitative work. Slightly slower than No. 2, but very retentive. Will withstand considerable washing. Especially suited for fine precipitates, such as Metastannic Acid, Calcium Oxalate, and Ammonium Phospho-Molybdate. Very satisfactory for filtering the solution of a fusion made with Eschka's mixture in determining Sulphur in coal and coke; can also be used in recovering small quantities of Silver in the form of chloride.

Diameter, cm.	7	9	11	12.5	15	18.5
Per 100 circles.....	\$0.40	.50	.57	.74	1.04	1.48

FILTER PAPER, Whatman No. 3, same as No. 5416, but in sheets 46.5 x 57 cm.

5417. Per 100 sheets..... 10.20
5418. Per ream (500 sheets)..... 46.40

5420. **FILTER PAPER, Whatman No. 4 (S. & S. No. 604)**, a soft paper of more open texture than the preceding. Extremely rapid, but not recommended for use with the finest precipitates. Especially adapted for the rapid filtration of gelatinous and large particle precipitates such as Ferric Hydroxide and Aluminum Hydroxide; also useful for Pharmaceutical purposes, such as the filtration of fruit juices, syrups, oils, etc. Widely used in Copper and other Ore Mining, Sugar and Cement Laboratories.

Diameter, cm.	7	9	11	12.5	15	18.5	24
Per 100 circles.....	.30	.40	.50	.65	.90	1.30	2.22

FILTER PAPER, Whatman No. 4 (S. & S. No. 604), same as No. 5420, but in sheets 46.5 x 57 cm.

5421. Per 100 sheets..... 8.75
5422. Per ream (500 sheets)..... 39.90

5424. **FILTER PAPER, Whatman No. 5 (S. & S. No. 602)**, a very tough, hard paper of close texture, that will retain the finest precipitates, such as Barium and Lead Sulphates even when freshly precipitated. Especially suited for use with solutions which are filtered with difficulty, and for vacuum filtration with the Buechner funnel, etc.

Diameter, cm.	7	9	11	12.5	15
Per 100 circles.....	.27	.34	.41	.54	.75

5430. **FILTER PAPER, Whatman No. 30 (Dreverhoff No. 207; Munktell No. O)**, a single-acid washed paper of low ash content, rapid and retentive. Very satisfactory for the filtration of Ammonium Phospho-Molybdate, Barium Sulphate when properly precipitated, for volumetric Lime determinations and for general quantitative work when the lowest ash is not important. Extensively used in Cement and Metallurgical Laboratories.

Diameter, cm.	7	9	11	12.5	15	18.5
Ash weight per circle, grams.....	.00012	.0002	.0003	.0004	.00057	.00087
Per 100 circles.....	.68	.90	1.20	1.50	1.90	2.70

5432. **FILTER PAPER, Whatman No. 31 (Munktell No. OB)**, a single-acid-washed paper, similar to No. 30, but more open in texture, making it more rapid. On account of its extreme rapidity it is not recommended for the finest precipitates. Suitable for the very rapid filtration of gelatinous and large particle precipitates, for volumetric determinations of Phosphates, for Silicon in Iron Analysis, and general rapid quantitative separations where the lowest ash weight is not essential. Extensively used in Metallurgical Laboratories.

Diameter, cm.	7	9	11	12.5	15	18.5
Ash weight per circle, grams.....	.00012	.0002	.0003	.0004	.00057	.00087
Per 100 circles.....	.68	.90	1.20	1.50	1.90	2.70

5438. **FILTER PAPER, Whatman No. 40 (S. & S. No. 589², White Ribbon)**, a double-acid-washed paper of very low ash, all mineral matter having been removed by treatment with hydrochloric and hydrofluoric acids. Filters rapidly and retains fine precipitates. This is the **standard double-washed grade for analytical purposes**. Excellently suited for Barium Sulphate when properly precipitated and filtered hot, also for Lead Sulphate, and for crystalline precipitates, such as Magnesium-Ammonium Sulphate, etc.

Diameter, cm.	5.5	7	9	11	12.5	15
Ash weight per circle, grams.....	.00003	.00005	.000082	.00012	.00016	.00023
Per 100 circles.....	1.10	1.20	1.70	2.00	2.30	2.70

For Quantity Discounts, see Page 239.



No. 5460.



No. 5462.

5440. **FILTER PAPER, Whatman No. 41 (S. & S. No. 589¹, Black Ribbon)**, a double-acid-washed paper similar to No. 40, but more open in texture and therefore filters more rapidly. Suitable for Iron, Aluminum, and other gelatinous precipitates which can be filtered quickly and washed rapidly and easily. Widely used in determining Silicon in Iron and Steel Analysis.

Diameter, cm.	7	9	11	12.5	15
Ash weight per circle, grams.....	.00005	.000082	.00012	.00016	.00023
Per 100 circles.....	\$1.20	1.70	2.00	2.30	2.70

5442. **FILTER PAPER, Whatman No. 42 (S. & S. No. 589³, Blue Ribbon)**, a double-acid-washed paper, similar to No. 40, but much harder and extremely close in texture. On account of its close texture it is recommended for use with the filter pump and as folded filters where possible. Especially adapted for the finest precipitates which tend to pass through the filter paper, such as Barium Sulphate when precipitated in cold solution, and in general for precise analytical work where speed is not important.

Diameter, cm.	5.5	7	9	11	12.5	15
Per 100 circles.....	1.10	1.20	1.70	2.00	2.30	2.70

5444. **FILTER PAPER, Whatman No. 43 (S. & S. No. 589⁴, Yellow Ribbon)** a double-acid-washed paper, of the same stock as No. 40, but having been subjected to an additional chemical process which renders it **fat-free**. Especially suited for the recovery of the ether extract in the Roese-Gottlieb Fat Test, and in general for any purposes requiring a fat-free paper.

Diameter, cm.	9	11	12.5
Per 100 circles.....	2.20	2.55	2.80

5446. **FILTER PAPER, Whatman No. 44 (S. & S. No. 590)**, a double-acid-washed paper of thinner substance and lower ash content than the preceding numbers. It will retain the finest precipitates, but is slightly slower in filtration than No. 40. No. 44 is recommended for use when the **greatest possible degree of accuracy** in quantitative work is required.

Diameter, cm.	7	9	11	12.5	15
Ash weight per circle, grams.....	.00003	.00005	.000077	.0001	.00014
Per 100 circles.....	1.50	2.20	2.55	2.80	3.60

5452. **FILTER PAPER, Whatman No. 50 (S. & S. No. 575)**, a paper specially hardened by treatment with Nitric Acid. Very tough, will resist great pressure, and retain the very finest precipitates. Can be used repeatedly, the hard smooth surface permitting precipitates to be scraped or washed off without injury to the paper. Especially recommended for use with vacuum. Suitable for very fine precipitates and for filtering corrosive liquids such as Acids and strong Alkalies. Should be used when it is desired to transfer a precipitate without ignition. Widely used for filtering Biological products, as the hardened surface prevents contamination of the filtered product by particles of paper when scraped off. Can be used as a substitute for platinum cones, and as supports for large folded filters to prevent them bursting at the points.

Diameter, cm.	5.5	7	9	11	12.5	15	18.5	24	27
Per 100 circles.....	.90	1.20	1.70	2.00	2.30	2.70	3.60	6.10	7.30

For Quantity Discounts, see Page 239.

5460. **FILTER PAPER BOXES**, of cardboard, square, telescoping form, to hold 100 filters. Very convenient for keeping filters clean and free from dust.

No.	A	B	C	D
For filters, cm.....	9	11	12.5	15
Per dozen.....	.30	.45	.55	.60

5462. **FILTER PAPER CASE**, of japanned tin, convenient for holding filters of different sizes. Will take 6 sizes from 7.5 cm to 18.5 cm in diameter 2.50



No. 5468.



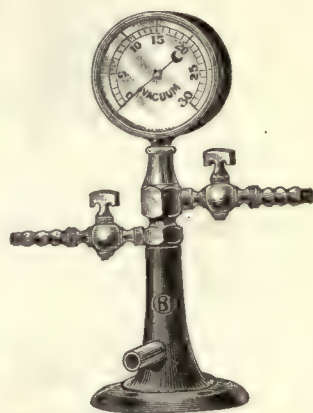
Plate and Frame of No. 5468.



No. 5476.



No. 5478.



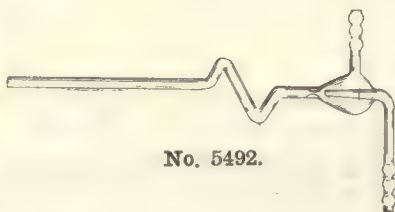
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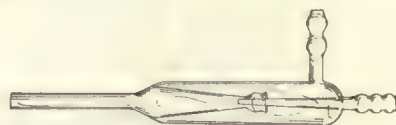
No. 5480.



No. 5482.



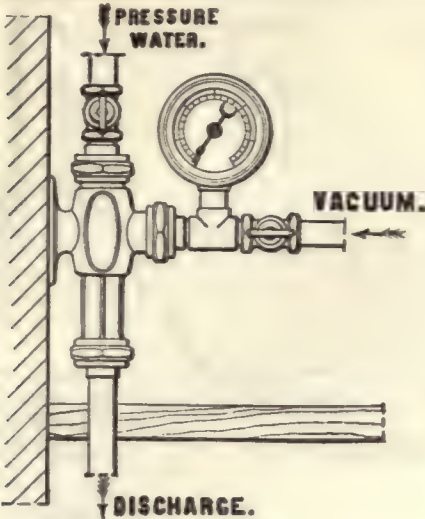
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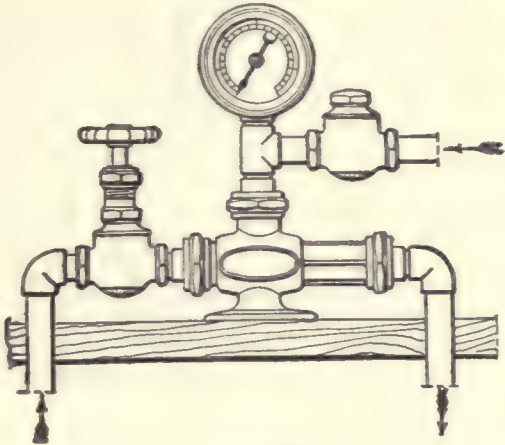
No. 5494.

FILTER PLATES, see Filter Disks.

5468. **FILTER PRESS, Experimental Form**, for making practical tests on a small scale. It is of rugged construction, with parts of iron, built to stand a pressure of 150 pounds to the square inch. Both corrugated plates and extension frames are provided, enabling either filter paper or cloth to be used. Complete with reservoir, hand pump of iron with brass valves, pressure gage, siphon, brass discharge cocks, two filter plates, three frames, filter paper and cloth. Weight, about 125 pounds. \$75.00
5470. **FILTER PRESS, Experimental Form**, same as No. 5468, but with all parts which come in contact with the material made of brass. 100.00
5476. **FILTER PUMP, Aspirator, new design, of brass. Very efficient.**
- | | | | |
|------------------------------------|------|------|------|
| No. | A | B | C |
| Length, inches. | 3¾ | 4¾ | 5¾ |
| Size I. P. thread, inches. | 1/8 | 1/4 | 3/8 |
| Each | 1.50 | 1.70 | 2.00 |
5478. **FILTER PUMP, Richards', of brass.**
- | | | | |
|---------------------------------------|------|------|------|
| No. | A | B | C |
| Length, inches. | 7 | 7 | 13 |
| Size of I. P. thread, inches. | 1/8 | 3/8 | 3/4 |
| Each | 1.70 | 2.80 | 8.50 |
5480. **FILTER PUMP COUPLING, of brass, to connect Nos. 5476 and 5478 to a threaded faucet.**
- | | | | | |
|--|-----|-----|-----|------|
| No. | A | B | C | D |
| For filter pump, I. P. thread, inches. | 1/8 | 1/4 | 3/8 | 3/4 |
| Each | .35 | .35 | .35 | 1.00 |
5482. **FILTER PUMP COUPLING, of brass, to connect Nos. 5476 and 5478 with smooth faucet.**
- | | | | | |
|--|-----|-----|-----|------|
| No. | A | B | C | D |
| For filter pump, I. P. thread, inches. | 1/8 | 1/4 | 3/8 | 3/4 |
| Each | .65 | .65 | .65 | 2.50 |
5484. **FILTER PUMP, of brass, on base with vacuum gage, inlet and outlet tubes. 10.00**
5485. **FILTER PUMP, same as No. 5484, but without vacuum gage 6.00**
5486. **FILTER PUMP, same as No. 5484, with vacuum gage and stop-cocks on inlet and outlet tubes 12.00**
5487. **FILTER PUMP, same as No. 5486, but without vacuum gage. 7.50**
5492. **FILTER PUMP, Geissler's, of glass. 1.00**
5494. **FILTER PUMP, Muencke's, of glass. 2.00**



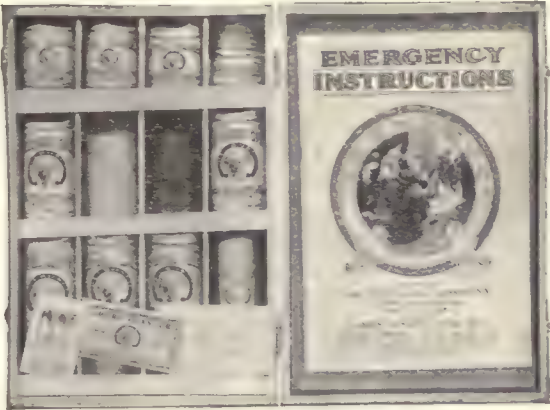
No. 5502.



No. 5504.

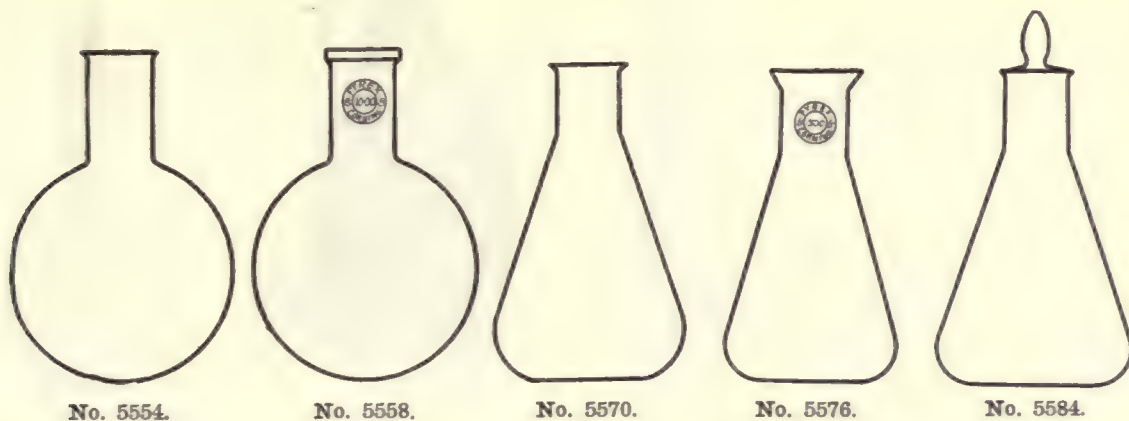


No. 5510.



No. 5520.

5502. **FILTER PUMP, Water-Jet**, very efficient for use in filtration, percolation, evaporation, distillation, and condensation. May be permanently attached or may be used with rubber tube connections. Requires only 10 pounds water pressure. With 20 pounds pressure, the capacity is one-third cubic foot of air per minute. A one gallon vessel may be exhausted to a vacuum of 29½ inches of mercury in five minutes with 20 pounds pressure. Complete with vacuum gage, connection tee and two stop-cocks..... \$20.00
5504. **FILTER PUMP, Steam-Jet**, similar to No. 5502, but for use with steam instead of water. A one gallon vessel may be exhausted to a vacuum of 24 inches of mercury in seven seconds with 50 pounds pressure. Complete with vacuum gage, connecting tee, stop and check valves... 20.00
5510. **FILTER RACKS**, of galvanized iron wire with rubber ring, to hold filter paper away from sides of funnel to facilitate rapid filtration.
- | No. | A | B | C | D |
|------------------------|-----|-----|-----|------|
| Diameter, inches | 5 | 7 | 9 | 12 |
| Each | .40 | .50 | .75 | 1.00 |
5514. **FINGER COTS, Rubber**.
- | No. | A | B |
|-----------------|-----|-------|
| For | men | women |
| Per dozen | .60 | .60 |
5520. **FIRST AID CABINET**. A neat hardwood case, 8x12x3½ inches deep, containing: one 1-inch gauze bandage; two 2-inch gauze bandages; one 2-inch cotton bandage to bind other dressings; one can mustard, especially prepared for emetics; two packages absorbent cotton; one package styptic gauze, medicated, to stop bleeding; one package surgical gauze, plain, for pads and compresses; one tourniquet, to stop arterial bleeding; one can powdered antiseptic soap, for washing hands and wounds; one can Recresco Ointment, for burns, scalds, cuts, etc.; one can Kapsikar Embrocation, for use as counter-irritant, for sprains, strains, congestion, etc.; one package court plaster; three safety pins; one envelope hooks and eyes, to hang case on wall. An excellent cabinet to have about the laboratory for treating cuts and burns. Complete as described 3.00



No. 5554.

No. 5558.

No. 5570.

No. 5576.

No. 5584.

5554. FLASKS, Round Bottom, Balloon Form, Resistance Grade, with heavy vial mouth.

Capacity, cc.....	100	250	500	1000	1500	2000	3000	4000
To take rubber stopper, No.....	5	6	7	8	7	9	9	10
Number in original case.....	108	96	72	36	..	18	12	..
Each .....	.13	.15	.21	.34	.46	.50	.75	.135
Per dozen in original case.....	\$1.40	1.62	2.27	3.67	4.97	5.40	8.10	14.58

5558. Flasks, Round Bottom, Balloon Form, Pyrex Glass, with short ring neck.

Capacity, cc.....	200	500	1000	1500	2000	3000	5000	12000	22000
To take rubber stopper, No.....	3	6	8	9	10	10	11	11	12
Number in original case.....	144	72	36	24	18	12	6	6	8
Each .....	.24	.38	.55	.66	.78	.99	1.29	3.00	6.60
Per dozen in original case.....	2.59	4.10	5.94	7.13	8.42	10.69	13.93	32.40	71.38

5570. FLASKS, Erlenmeyer, Resistance Grade.

Capacity, cc.....	60	120	180	250	350	500	700	1000	1500	2000
To take rubber stopper, No.	2	3	4	5	5	6	7	7	9	9
Each .....	.12	.13	.14	.15	.19	.21	.29	.34	.42	.50
Per 100 in original case.....	10.80	11.70	12.60	13.50	17.10	18.90	26.10	30.60	37.80	45.00

5576. FLASKS, Erlenmeyer, Pyrex Glass.

Capacity, cc.....	25	50	100	150	200	250	300	500
To take rubber stopper, No.....	00	1	3	4	5	5	6	6
Number in original case.....	360	276	180	252	144	132	132	72
Each .....	.13	.14	.15	.16	.18	.20	.21	.27
Per dozen in original case.....	1.40	1.51	1.62	1.73	1.94	2.16	2.27	2.92

Capacity, cc.....	600	750	1000	1500	2000	3000	4000
To take rubber stopper, No.....	6	7	8	9	10	10	10
Number in original case.....	60	48	36	24	24	15	12
Each .....	.29	.33	.42	.51	.60	.79	1.00
Per dozen in original case.....	3.13	3.56	4.54	5.51	6.48*	8.53*	10.80*

*Boxing charged at manufacturer's cost.

5573. FLASKS, Erlenmeyer, Pyrex Glass, with extra wide mouth.

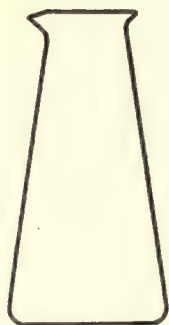
Capacity, cc.....	250	500	750
To take rubber stopper, No.....	7	10	10
Number in original case.....	132	60	48
Each .....	.20	.27	.33
Per dozen in original case.....	2.16	2.92	3.56

5584. FLASKS, Erlenmeyer, with Ground Glass Stopper, Resistance Grade.

Capacity, cc.....	60	125	250	500	1000
Each45	.50	.60	.65	.90



No. 5600.



No. 5602.



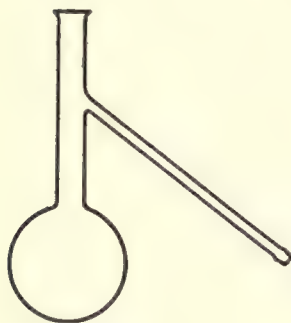
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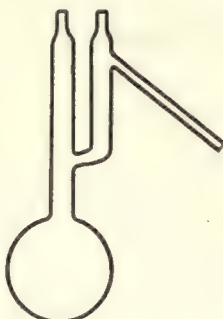
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No. 5610.



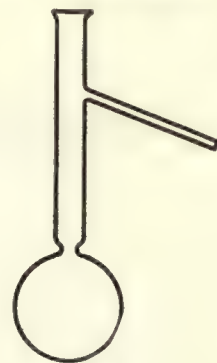
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No. 5622.

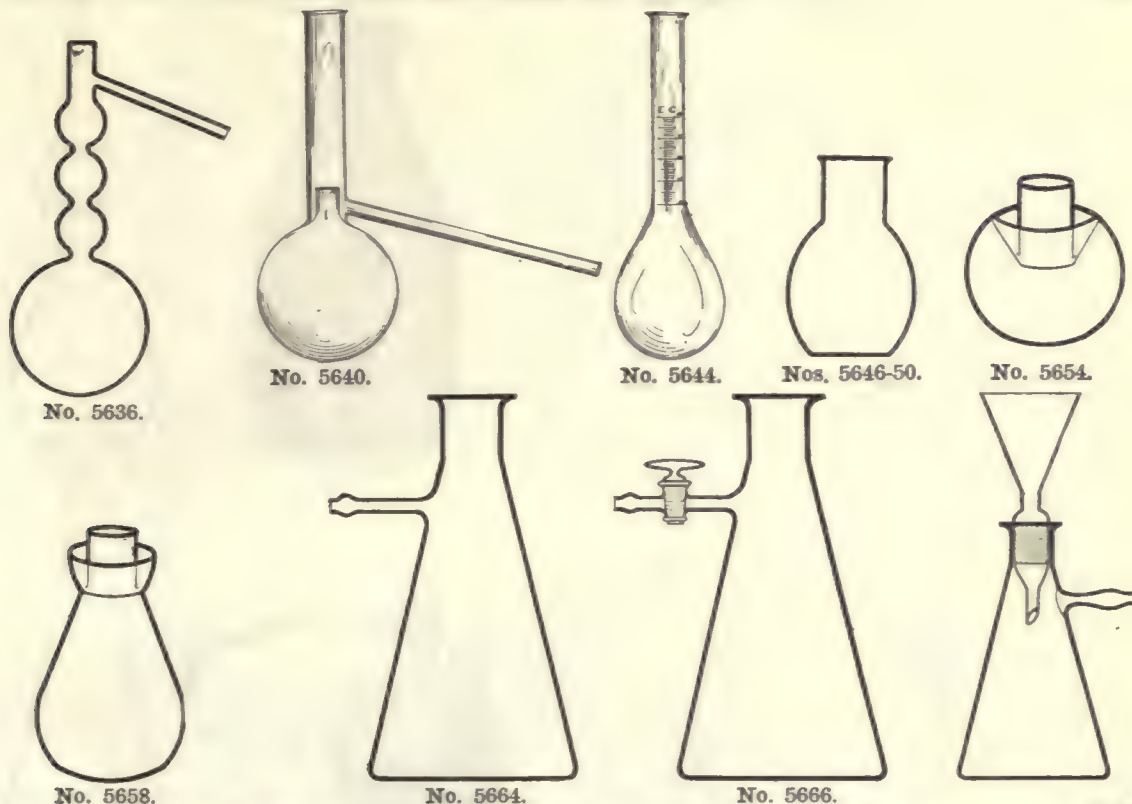


No. 5624.

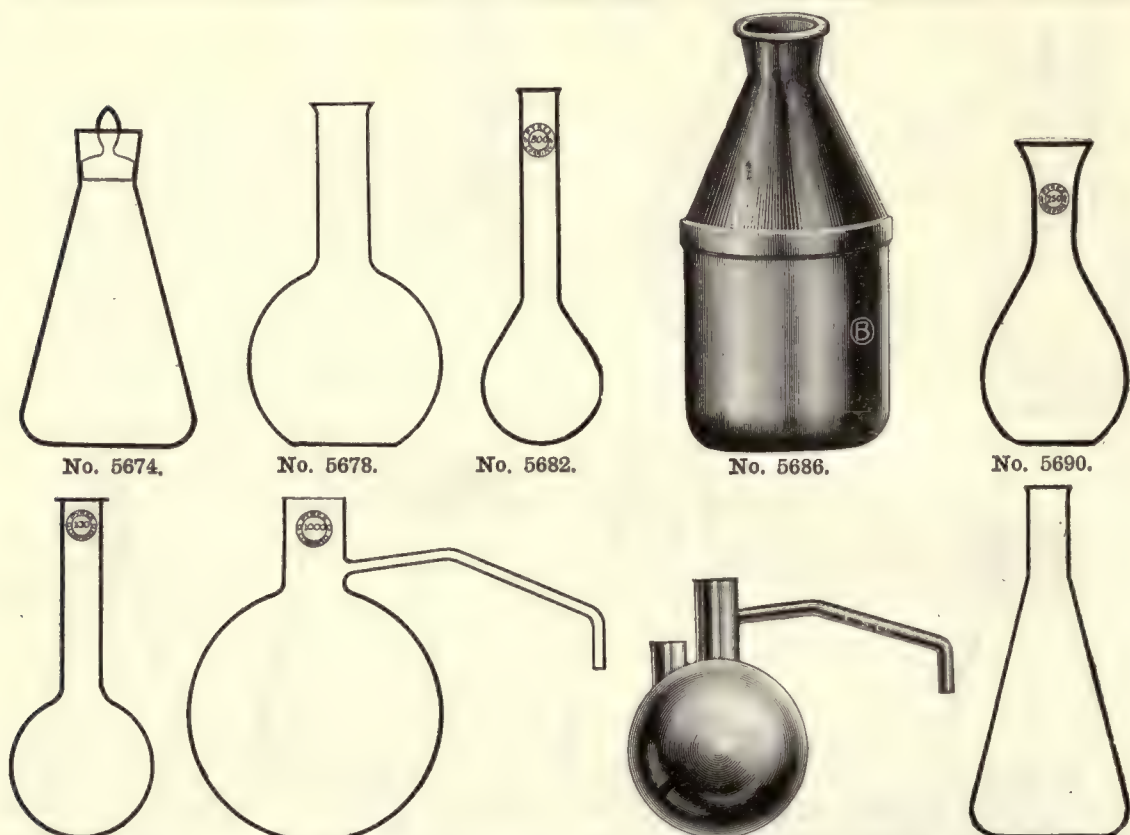


No. 5632.

5600. **FLASK, Acetylation**, with ground in condensing tube, for assaying menthol in oil of peppermint. Capacity, about 150 cc; length of condensing tube, 100 cm. (See United States Pharmacopoeia for 1916, page 296)..... **\$1.50**
5602. **FLASKS, Assay Beaker Flasks, Resistance Grade, high form, with lip.**
- | | | | | |
|---------------------------------|------|------|------|------|
| Capacity, cc..... | 125 | 250 | 500 | 1000 |
| Number in original case..... | 180 | 132 | 72 | 36 |
| Each | .13 | .17 | .25 | .42 |
| Per dozen in original case..... | 1.40 | 1.84 | 2.70 | 4.54 |
5606. **FLASK, Cassia**, with ground glass stopper, for assaying cinnamic aldehyde. Total capacity, about 200 cc; neck graduated to 10 cc in $\frac{1}{10}$ cc divisions. (See United States Pharmacopoeia for 1916, page 289)..... **2.25**
5608. **FLASKS, Copper**, heavy, polished, with ring neck. Capacity, cc..
- | | | | | |
|------------|------|------|------|------|
| 250 | 500 | 1000 | 2000 | |
| Each | 2.30 | 2.90 | 3.70 | 5.00 |
5610. **FLASKS, Copper Oxide**, with ground glass stopper, and glass cap ground on; for keeping copper oxide pure for use in analysis.
- | | | | |
|-------------------|------|------|------|
| Capacity, cc..... | 125 | 250 | 500 |
| Each | 1.50 | 1.80 | 2.40 |
5618. **FLASKS, Distilling, Pyrex Glass**, with side tube in middle of neck.
- | | | | | | | | | |
|-------------------|-----|-----|-----|-----|------|------|------|------|
| Capacity, cc..... | 50 | 125 | 250 | 500 | 1000 | 1500 | 2000 | 3000 |
| Each | .54 | .60 | .80 | .96 | 1.30 | 1.85 | 2.10 | 2.60 |
- Note:—If specified when ordering, side tube may be located where desired.
5620. **FLASKS, Distilling, Opaque Fused Silica**, regular form with side arm in center of neck. Liquid levels are readily visible.
- | | | | | |
|-------------------|------|------|------|-------|
| Capacity, cc..... | 50 | 100 | 250 | 500 |
| Each | 4.05 | 5.95 | 9.40 | 11.25 |
5622. **FLASKS, Distilling, Claissen's.**
- | | | | | | |
|-------------------|-----|-----|-----|-----|------|
| Capacity, cc..... | 10 | 60 | 125 | 250 | 500 |
| Each | .40 | .60 | .70 | .80 | 1.20 |
5624. **FLASKS, Distilling, Engler's, Pyrex Glass**, for fractional distillation of creosote and petroleum oils. Made to standard dimensions, according to the American Society for Testing Materials and the U. S. Bureau of Mines.
- | | | | |
|-------------------|-----|-----|-----|
| Capacity, cc..... | 100 | 200 | 250 |
| Each | .55 | .65 | .80 |
5632. **FLASKS, Distilling, Hempel's, Pyrex Glass**, for the distillation of creosote. (See Circular 112, Forest Service of United States Department of Agriculture.) Capacity, 500 cc..... **1.20**



5636.	FLASKS, Distilling, Ladenburg's, with three bulbs in neck. Capacity, 500 cc.....	\$1.20
5640.	FLASKS, Distilling, Lunge's Tar, with trap.	
	Capacity, cc.....	125 250 500
	Each .....	.75 1.10 1.50
	Note:—Other types of distilling flasks will be made to specifications.	
5644.	FLASK, Elutriating, Benningsen, with neck graduated to 40 cc in 1 cc divisions. Capacity, about 400 cc.....	1.50
5646.	FLASKS, Extraction, Resistance Grade, flat bottom, with wide mouth and vial neck.	
	Capacity, cc.....	60 125 175 250
	Outside diameter of neck, mm.....	31 35 40 43
	To take rubber stopper, No.....	7 7 8 9
	Number in original case.....	192 120 144 96
	Each .....	.11 .13 .17 .21
	Per dozen in original case.....	1.19 1.40 1.84 2.27
5650.	FLASKS, Extraction, Pyrex Glass, flat bottom, with wide mouth and vial neck.	
	Capacity, cc.....	50 100 150 250 500
	To take rubber stopper, No.....	6 6 7 8 10
	Number in original case.....	168 120 108 120 60
	Each .....	.13 .15 .17 .19 .29
	Per dozen in original case.....	1.40 1.62 1.84 2.05 3.13
5654.	FLASKS, Extraction, Knorr's Original Form, for mercury seal; capacity, 100 cc.....	.50
5656.	FLASKS, Extraction, Knorr's, as modified by Walter and Goodrich, with two holes in neck for return flow of ether. Capacity, 100 cc.....	.50
5658.	FLASKS, Extraction, Sy's Form, with trough for mercury seal and with holes in neck for return of ether. Capacity, 100 cc.....	.80
	For other EXTRACTION FLASKS, see Nos. 5209 and 5228.	
5664.	FLASKS, Filtering, Erlenmeyer form, of heavy glass, with side neck.	
	Capacity, cc.....	250 500 1000 2000
	Each .....	.50 .65 1.00 1.95
5666.	FLASKS, Filtering, same as No. 5664, with glass stop-cock on side neck.	
	Capacity, cc.....	250 500 1000
	Each	2.50 2.80 3.00
5668.	FLASKS, Filtering, same as No. 5664, with side tube, and funnel ground in neck.	
	Capacity, cc.....	250 500 1000
	Each	1.65 2.00 2.75
5672.	FLASK, Gray's Carbon Residue, Opaque Fused Silica, for determining the carbon residue of lubricating oils. Capacity, 50 cc. May be used repeatedly, as the residue can be burned out with oxygen. (See Report of Committee D-2 of the American Society for Testing Materials for 1914)	4.05
	FLASKS, Gas Generating, see Gas Generators.	



- No. 5694. No. 5698. No. 5704. No. 5708.
5674. **FLASKS**, for Iodine Number Determination of Oils, Resistance Grade, Erlenmeyer form, with flaring lip and hollow stopper ground deep in neck to form reservoir.
- | | | | |
|-------------------|--------|------|------|
| Capacity, cc..... | 125 | 250 | 500 |
| Each | \$0.90 | 1.00 | 1.20 |
5678. **FLASKS**, Joliet, for use in analysis of iron and steel. Of heavy glass, made to resist heat.
- | | | | |
|-------------------|-----|------|------|
| Capacity, cc..... | 500 | 1000 | 2000 |
| Each | .29 | .43 | .60 |
5682. **FLASKS**, Kjeldahl, Pyrex Glass, with long neck and round bottom:
- | | | | |
|---------------------------------|------|------|------|
| Capacity, cc..... | 300 | 500 | 800 |
| To take rubber stopper, No..... | 5 | 6 | 6 |
| Total length, mm..... | 298 | 327 | 365 |
| Number in original case..... | 60 | 36 | 36 |
| Each | .28 | .37 | .45 |
| Per dozen in original case..... | 3.02 | 4.00 | 4.86 |
5686. **FLASK**, Kjeldahl, Copper, heavy, with flat bottom. Diameter, 4 inches; height, 8½ inches; capacity, 1000 cc..... 4.25
5690. **FLASKS**, Low's, for Copper Determinations Pyrex Glass, improved form, with flaring neck.
- | | | |
|---------------------------------|------|------|
| Capacity, cc..... | 180 | 250 |
| Number in original case..... | 144 | 108 |
| To take rubber stopper, No..... | 5 | 6 |
| Each | .25 | .30 |
| Per dozen in original case..... | 2.70 | 3.24 |
5694. **FLASKS**, Melting Point or Oxygen, of Pyrex Glass, with long necks. Can be used for high temperatures. Capacity, cc.....
- | | | | | |
|------------|-----|-----|------|-----|
| 125 | 250 | 500 | 1000 | |
| Each | .19 | .26 | .37 | .56 |
5698. **FLASK**, Moisture, of Pyrex Glass, for use in official Brown-Duvel Moisture Tester for determining moisture in grain. Capacity, 1000 cc. (See Circular No. 72, Bureau of Plant Industry, United States Department of Agriculture)..... 1.50
5702. **FLASK**, Moisture, Copper, single wall, for use in Brown-Duvel Moisture Tester. Capacity, 1000 cc..... 3.00
5704. **FLASK**, Moisture, Copper, double wall, for use in Brown-Duvel Moisture Tester, for determining moisture in flour and ground samples. Capacity of the inner vessel, 900 cc. (See Bulletin No. 56 of the Bureau of Plant Industry, United States Department of Agriculture)..... 6.00
5708. **FLASKS**, Phosphorus, Erlenmeyer form with narrow neck, Resistance Grade. Used extensively in iron analysis for determination of phosphorus. Capacity, 400 cc; to take rubber stopper No. 4. Number in original case, 96..... Each. .25
- Per dozen in original case 2.70



No. 5728.



No. 5732.



No. 5736.



No. 5740.



No. 5762.



No. 5764.



No. 5766.

5712.	FLASKS, Transparent Quartz, regular shape, flat bottom, with long, narrow neck.								
	Approx. capacity, cc...	15	25	50	100	150	200	250	500
	Each	\$3.30	4.50	6.00	10.80	14.40	19.20	22.80	30.00
5714.	FLASKS, Transparent Quartz, flat bottom, with short, wide neck.								
	Approx. capacity, cc...	15	25	50	100	150	200	250	500
	Each	3.30	4.50	6.00	10.80	14.40	19.20	22.80	30.00
5716.	FLASKS, Transparent Quartz, round bottom, with long, narrow neck.								
	Approx. capacity, cc...	15	25	50	100	150	200	250	500
	Each	3.30	4.50	6.00	10.80	14.40	19.20	22.80	30.00
5718.	FLASKS, Transparent Quartz, round bottom, with short, wide neck.								
	Approx. capacity, cc...	15	25	50	100	150	200	250	500
	Each	3.30	4.50	6.00	10.80	14.40	19.20	22.80	30.00
5720.	FLASKS, Transparent Quartz, Erlenmeyer form.								
	Capacity, cc.....			50	100	200	500		
	Each			6.00	10.80	19.20	30.00		
5724.	FLASKS, Opaque Fused Silica, flat bottom, with vial mouth. These are sufficiently clear to make visible the level of liquid inside, and are specially adapted for direct heating by electric resistance wires. Very useful for boiling at high temperatures, destructive distillation, etc.								
	Capacity, cc.....			50	100	200	250	500	
	Each			2.75	4.00	5.00	6.25	7.50	
5728.	FLASKS, Soil Analysis, Pyrex glass, Erlenmeyer form, with condenser tube 100 cm long ground in neck.								
	Capacity, cc.....						250	500	
	Each						1.40	1.65	
5732.	FLASK, Sulphur, Pyrex glass, for use in detecting sulphured grain. Consists of an Erlenmeyer flask with ground in stopper and delivery tube. Capacity, 500 cc. (See Circular 111 of the Bureau of Plant Industry, United States Department of Agriculture).....								
									1.95
5736.	FLASKS, Sulphur, flat bottom, with side neck bent at right angle, as used in determining sulphur in iron and steel. Capacity, 500 cc.....								
									.75
5740.	Flasks, Johnson's Sulphur, Resistance Grade, of heavy glass with heavy vial neck. Used widely for determining sulphur in iron and steel analysis. Capacity, 270 cc; neck of size to take No. 7 rubber stopper; number in original case, 96.....								
									Each .22
	FLASKS, Vacuum, see Vacuum Tubes. Per dozen in original case 2.38								
5762.	FLASKS, Volumetric, accurately graduated to contain, without stopper.								
	Capacity, cc.....	10	25	50	100	200	250	300	500
	Each .....	.45	.45	.50	.50	.55	.60	.80	.85
5764.	FLASKS, Volumetric, same as No. 5762, but with glass stopper ground in.								
	Capacity, cc.....	10	25	50	100	200	250	300	500
	Each .....	.75	.75	.80	.85	.90	.95	1.15	1.20
5766.	FLASKS, Volumetric, with glass stopper and two marks on neck, graduated both to contain and deliver. Capacity, cc.....								
						100	250	500	1000
	Each .....					.90	1.10	1.40	1.70



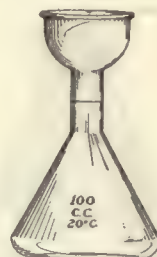
No. 5768.



No. 5770.



No. 5772.



No. 5776.



No. 5780.



No. 5784.



No. 5786.



No. 5788.



No. 5792.

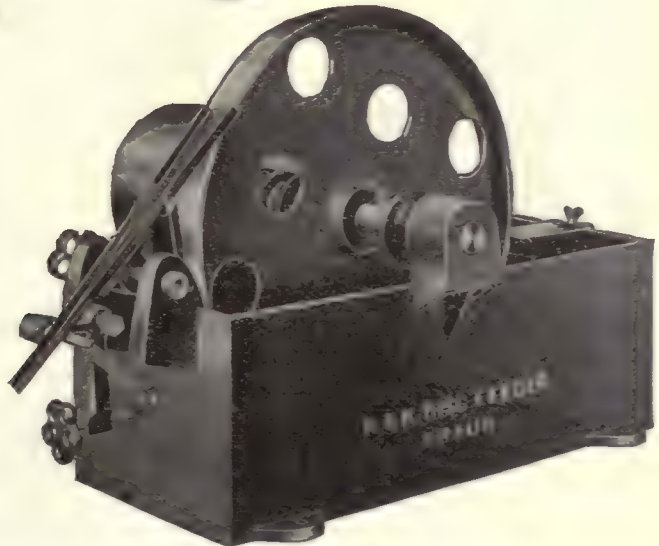


No. 5846.

5768. **FLASK, Volumetric, Foots Flask**, graduated, for determining fatty acid in cottonseed by saponification. Capacity of bulb, 250 cc. \$2.25
5770. **FLASK, Volumetric**, of heavy glass, with short neck, and mark low on neck. Widely used in fertilizer laboratories. Capacity, 250 cc. .65
5772. **FLASK, Volumetric**, graduated to deliver 58.3 cc, for determining degree of alkalinity in feed water for boilers. .80
5776. **FLASK, Volumetric**, conical shape with enlarged mouth, as used in oil analysis. Capacity, 100 cc. 1.00
5780. **FLASK, Volumetric**, with wide neck, for determination of insoluble phosphoric acid. Capacity, 200 cc; diameter of neck inside, 25 mm. .65
5784. **FLASKS, Volumetric, Sugar**, with two marks on neck, without stopper.
- | | | | |
|-------------------|---------|-----------|-----------|
| Graduated at, cc. | 50 & 55 | 100 & 110 | 200 & 220 |
| Each | .60 | .70 | .80 |
5786. **FLASK, Volumetric, Sugar, Bates' Form**, pear shape with funnel top. Capacity, 100 cc. .65
5788. **FLASKS, Volumetric, Sugar, Kohlrausch Form**, with enlarged mouth, and one mark on neck.
- | | | | | | |
|-------------------|-----|-----|-------|-------|-------|
| Graduated at, cc. | 100 | 200 | 200.6 | 201.2 | 201.4 |
| Each | .58 | .60 | .70 | .75 | .75 |
5792. **FLASKS, Volumetric, Gile's Form**, glass stoppered, with bulb in neck and two marks. Used extensively for making normal solutions, as the 10 per cent. extra volume in the bulb may be used for checking, leaving an exact volume for correction.
- | | | | |
|-------------------|-----------|-------------|-------------|
| Graduated at, cc. | 500 & 550 | 1000 & 1100 | 2000 & 2200 |
| Each | 2.10 | 2.80 | 4.00 |
5812. **FLASKS, Volumetric, Precision or Normal**, without stopper, graduated to meet the requirements of the United States Bureau of Standards, with unofficial factory certificate.
- | | | | | | | |
|---------------------------|-----|------|------|------|------|------|
| Graduated to contain, cc. | 50 | 100 | 250 | 500 | 1000 | 2000 |
| Each | .90 | 1.10 | 1.50 | 1.90 | 2.40 | 3.00 |
5814. **FLASKS, Volumetric, Precision or Normal**, same as No. 5812, but standardized by the United States Bureau of Standards, with certificate.
- | | | | | | | |
|---------------------------|------|------|------|------|------|------|
| Graduated to contain, cc. | 50 | 100 | 250 | 500 | 1000 | 2000 |
| Each | 1.55 | 1.85 | 2.50 | 3.15 | 4.30 | 5.00 |
5818. **FLASKS, Volumetric, Precision or Normal**, same as No. 5812, but with glass stopper.
- | | | | | | | |
|---------------------------|------|------|------|------|------|------|
| Graduated to contain, cc. | 50 | 100 | 250 | 500 | 1000 | 2000 |
| Each | 1.30 | 1.50 | 1.90 | 2.25 | 3.00 | 3.50 |
5820. **FLASKS, Volumetric, Precision or Normal**, same as No. 5818, but standardized by the United States Bureau of Standards, with certificate.
- | | | | | | | |
|---------------------------|------|------|------|------|------|------|
| Graduated to contain, cc. | 50 | 100 | 250 | 500 | 1000 | 2000 |
| Each | 2.10 | 2.25 | 3.15 | 3.75 | 5.00 | 5.70 |
- FLASK HEATER, Electric Water Bath**, see No. 14296 De Khotinsky Electrically Heated Water Bath.
- FLASK HEATER, Electric Hot Plate**, see No. 7514 Heater, Combination Electric.
5846. **FLASK HEATERS**, of sheet iron, with asbestos strips fastened to sides, and openings for ventilation.
- | | | | | | | |
|------------------|-----|------|------|------|------|------|
| Diameter, inches | 4½ | 5 | 6 | 7½ | 8¼ | 10½ |
| Each | .80 | 1.10 | 1.30 | 1.60 | 1.80 | 2.20 |
- FLASK HOLDER, Suberite**, see Cork Rings, No. 3296.



No. 5868.



Nos. 5869-70.

5868. **FLOTATION MACHINE, Braun** (patented). A miniature machine suitable for laboratory tests, built similar to the standard size, producing every effect essential to determine to what extent an ore will lend itself to flotation. The machine is constructed of heavy cast iron, the interior consisting of a hollow cylinder which is coated with a special hard baked enamel, a wooden drum provided with a series of longitudinal air slots, and a larger number of longitudinal riffles running the entire length of the drum. An iron strip perforated with small holes placed tangentially to the periphery of the drum admits the pulp into the frothing box. The machine is split in the center, the top being hinged, which permits ready access to every working part and facilitates cleaning. When closed the top is held in place by thumb bolts, rubber gaskets insuring a tight joint. For taking samples of tailings a small hole is provided in the bottom of the frothing box, which is closed by means of a stopper. Capacity, from one to two pounds of dry product; shipping weight, 185 pounds; dimensions 27x21x12 inches; with tight and loose pulleys, 6x2 inches; speed recommended, 400 r. p. m. Complete with directions for use.. **\$90.00**
5869. **FEEDER FOR OILS, Braun Mechanical Disk**, for use with No. 5868. The problem of successful flotation depends to a great extent upon the regularity of the flow of reagents. The Braun Mechanical Disk Feeder eliminates detrimental results due to irregularity in feeding reagents. A disk of iron is mounted on a shaft and revolved within an iron tank. A thin film of oil adheres to the finished surface of the disk as it revolves through the oil. A portion of this film is transferred to the trough through which it flows into the flotation machine. The feed is regulated by adjusting the position of the trough by means of two micrometer screws. Grit, sludge, or any foreign matter cannot choke it. Fitted with tight and loose pulleys. Shipping weight, 120 pounds; length, 23 inches; width, 16 inches; height, 15 inches. Complete with directions for use..... **54.00**
5870. **FEEDER FOR ACIDS, Braun Mechanical Disk**, for use with No. 5868, of same construction and dimensions as No. 5869, but with disk of lead, lead lined tank, and trough of bronze to resist action of acids. Shipping weight, 160 pounds **80.00**



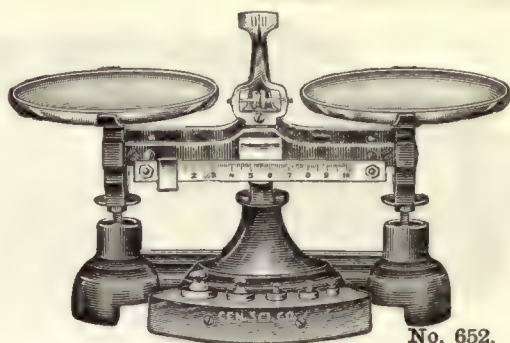
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No. 5906.



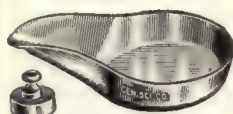
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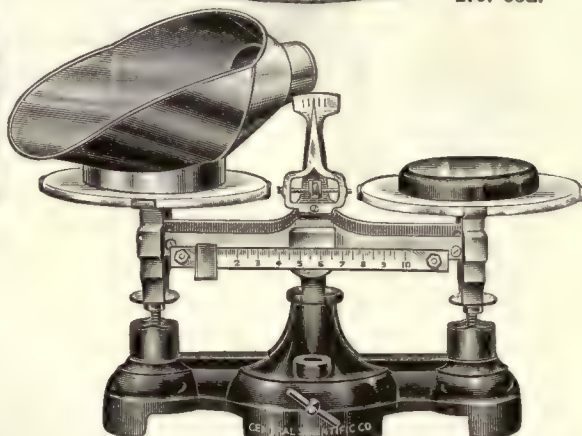
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No. 5930.



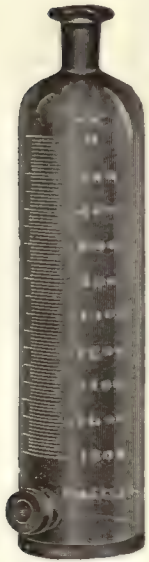
No. 826.



No. 654.

FLOUR TESTING APPARATUS

248. **APRON, Duck**, of heavy fine material, with bib and attached tie string, to protect clothing from flour and grease. Length, 50 inches. \$0.85
5906. **BAKING CYLINDERS**, as designed by the Columbus Laboratories, with graduated indicator and detachable cup for definite capacity. Two are desirable for comparative tests. each 7.50
- For Tongs for No. 5906 Baking Cylinders, see No. 6020.
- BALANCE, Analytical, for Flour Testing**, see Nos. 462, 466, 486 and 488.
- BALANCE, Porcelain Pan**, for general use, see No. 648.
652. **BALANCE, Baker's Scale**, same as No. 648 with the exception of the scale pans which are of nicked brass, 15 cm in diameter, and of shallow pan style. The graduated beam has a range of 10 grams in $\frac{1}{10}$ gram divisions, and brass weights from 10 grams to 100 grams are supplied, conveniently fitted into a projecting holder. The capacity is 2,000 grams. Sensibility is guaranteed to be $\frac{1}{10}$ gram. Actual tests show a much greater sensibility. 10.00
656. **FUNNEL SCOOP and Counterpoise**, accurately adjusted, for use with No. 648 Balance. Scoop holds approximately one kilogram of flour. 2.50
654. **BALANCE, Flour Test**, consisting of No. 648 Balance with the addition of No. 656 Funnel Scoop and Counterpoise. 10.00
826. **WEIGHING SCOOPS**, of aluminum, with large lip and counterpoise for use in weighing flour for protein tests; size B holds approximately 12 grams of flour, size C about 50 grams.
- | No. | A | B | C |
|---------------------------|------|------|------|
| Capacity, about, cc. | 10 | 30 | 125 |
| Each | 2.25 | 2.50 | 4.00 |
- BALANCE WEIGHTS for Flour Testing**, see Nos. 714 and 718.
- BOTTLES, Sample, for Flour**, see general heading **Bottles**.
- CARBONIC ACID APPARATUS**, for testing Baking Powder, see general heading **Carbon Dioxide Determination Apparatus**.
5918. **CUBIC INCH and Counterpoise**. Metal box of exact inside dimensions with accurate counterpoise. 6.50
- EXTRACTION APPARATUS**, see general heading **Extraction Apparatus**.
- FLOUR CONTAINER**, of galvanized iron, see **Bins and Containers**.
5926. **FLOUR SLICK**, of finest quality spring steel, highly polished and tapered to a thin flat edge. Size, $2\frac{1}{4} \times 6$ inches.75
- FURNACE, Ashing**, see general heading **Furnaces, Muffle**.
5930. **JARS, Chidlow Expansion**, for testing the rising qualities of dough.
- | No. | A | B | C |
|------------------------|------|------|------|
| Capacity, cc. | 1000 | 2000 | 3000 |
| Graduated in, cc. | 20 | 50 | 50 |
| Each | 2.50 | 2.90 | 3.20 |



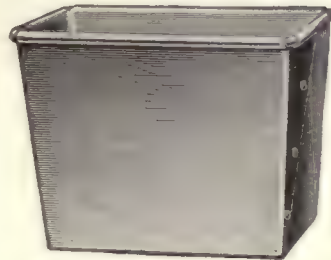
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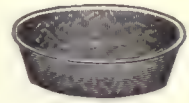
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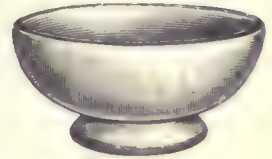
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No. 5962.



No. 3844.



No. 1814.

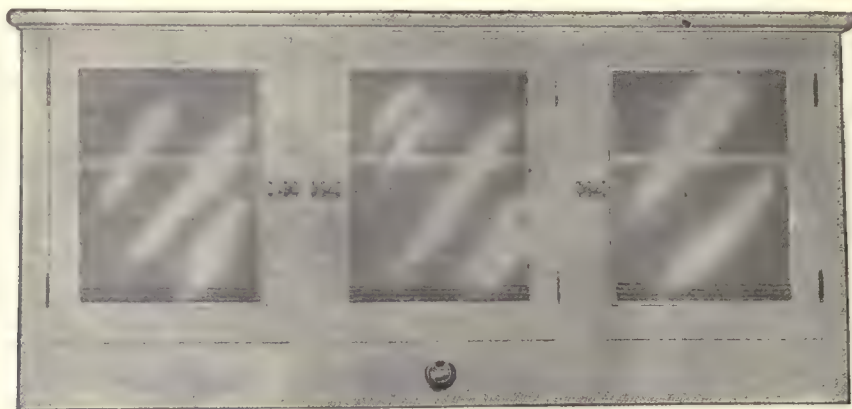


No. 5970.



No. 5972.

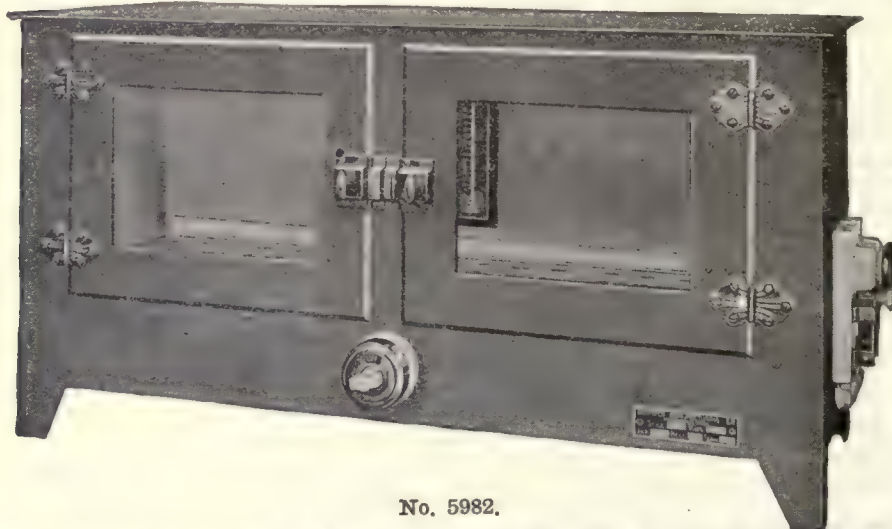
5932. **JAR, Chidlow Gas Collection**, graduated to 1800 cc in 20 cc divisions. Complete with accessory bottles, tubing and rubber stoppers..... \$6.50
5933. **JAR, Chidlow Gas Collection**, the graduated jar only of No. 5932..... 5.00
- JARS, Proofing and Dough Mixing**, see **Jars, Stoneware**.
5938. **KNIFE** for mixing dough. Substantially made, with ebony handle and heavy hand forged steel blade 6 inches long..... .80
- MAGNIFIERS** for examining flour, bolting cloth, etc., see general heading **Magnifiers**.
- MILLS** for grinding wheat samples, see **Crushing and Grinding Apparatus**.
- MOISTURE TESTERS** for Flour, see No. 7360, etc.
- NITROGEN DETERMINATION APPARATUS**, see general heading **Nitrogen Determination Apparatus**.
- OVENS, Baking**, see general heading **Ovens**.
5960. **PANS, Baking, sanitary, rounded corners and bottoms.**
- | No. | A | B |
|----------------------------|-------|-------|
| Top inside, inches..... | 8½x4½ | 9½x5½ |
| Bottom inside, inches..... | 7⅝x3⅝ | 8½x4½ |
| Depth, inches..... | 2¾ | 3 |
| Each | .25 | .35 |
| Per dozen | 2.50 | 3.50 |
5962. **PANS, Baking, laboratory type.** Depth, 5⅝ inches; width at top, 3½ inches; at bottom, 2¾ inches; length at top, 6⅝ inches; at bottom, 5⅝ inches.....each .70
per dozen 7.00
3844. **PANS, Washing**, of graniteware, round, with flat bottom, for use in washing out gluten from flour.
- | Capacity, quarts | 1½ | 1 | 2 |
|------------------------|-----|-----|-----|
| Each | .30 | .35 | .40 |
5966. **PLATE, glass, for slick test, 3x5 inches**..... .10
1814. **PORCELAIN BOWL** for use in washing out gluten, so-called pint size..... .35
5970. **PORCELAIN CUP**, without handle, used in gluten washing and flour mixing..... .25
5972. **PORCELAIN PLATE**, for use in covering stone jars in proofing cabinet. Diameter, 8¼ inches..... .20



Nos. 5978-9.

PROOFING CABINETS, Despatch Electric, designed especially for dough raising in wheat and flour testing laboratories. They are made of kiln dried lumber, have glass doors, removable slat shelves, asbestos lined heater chamber and are equipped with Despatch Open Wire Electric Heaters. Heaters are controlled by a two-point regulating switch system by means of which heat can be held at any temperature desired. The cases are finished in white enamel and are complete with thermometers. All sizes are 28 inches high and 14 inches deep.

	Despatch No.	520	524	526	527
	Length, inches	48	60	72	96
	Number of doors	2	3	4	5
5978.	For 110 volts	\$50.00	65.00	85.00	110.00
5979.	For 220 volts	50.00	65.00	85.00	110.00



No. 5982.

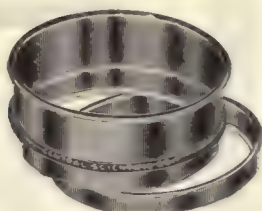
5982. **PROOFING CABINETS for Test Baking, Despatch Electric**, of polished steel, with glass observation doors and Despatch Open Wire Heaters for one heat. The walls are lined with asbestos board. Length, 29 inches; depth, 11 inches; height, 10 inches; power consumption, 200 watts. Complete with snap switch and fused entrance switch. No. A B
- | | | |
|-----------|-------|-------|
| For volts | 110 | 220 |
| Each | 27.50 | 27.50 |

PROTEIN DETERMINATION APPARATUS, see general heading **Nitrogen Determination Apparatus**.

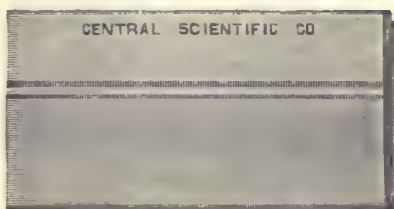
5988. **SAMPLE MAILING CASES**, of heavy cardboard with tin bottom and tin screw top. Thickly coated within with paraffine, with paraffined cardboard cap for top, so that the tube is air tight. Will not lose or take on moisture in transit. 2 inches in diameter by 5 inches long. Shipping labels included..... per 100 8.00
per 500 37.50
per 1000 70.00
5990. **SAMPLE MAILING CASES**, same as No. 5988, but 2 3/4 inches in diameter..... per 100 9.00
per 500 42.50
per 1000 80.00
- SCOOPS for Flour**, see general heading **Scoops**.
SIEVES for Flour, see general heading **Sieves**.



No. 13558.



No. 12096.



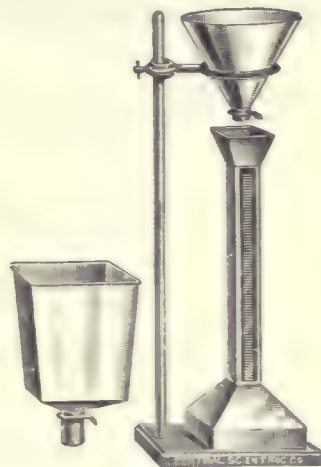
No. 12098.



No. 13514.



No. 12580.



No. 6026.



No. 6020.

12096. **SIEVE FRAME**, without bottom, but with brass ring for holding bolting cloth, 5 inches in diameter \$1.00

12098. **BOLTING CLOTH, Silk**, for making sieves, etc. The well known Anchor Brand. Standard weight, 40 inches wide.

No.	2	5	7	9	11	13	15	18	20	25
Mesh per linear inch.....	52	64	80	96	116	130	148	168	173	200
Per linear foot.....	2.40	2.80	3.00	3.20	3.80	4.60	5.40	7.20	10.00	11.00

SLICKS, Flour, see No. 5926.

12580. **SPATULA**, Steel, special 4 inch blade, with wooden handle, designed particularly for mixing a small dough ball for gluten and absorption tests90

For other **SPATULAS**, see general heading **Spatulas**.

13514. **THERMOMETER, Bake Oven**, of glass with 5 inch flanged metal scale with white filled figures, mounted on round disk metal base with asbestos mat attached. Range 100° to 600°F.... 1.50

13558. **THERMOMETER, Dough Testing**, of glass in 7 inch nickel-plated iron case, with 11 inch steel stem. The scale is of silvered metal with black filled figures and graduations. Range, 30° to 120°F. 8.00

6020. **TONGS, Cylinder**, for use with No. 5906 Baking Cylinder. Length, 24 inches, with special jaws 1.10

6026. **VOLUME OF LOAF APPARATUS**, for determining the volume of loaves of bread by displacement of flax or other seed. Consists of a vessel of known capacity, sufficiently large to contain loaves baked in Baking Pans Nos. 5960 and 5962, having an upright tube with graduated glass face and an auxiliary funnel. In use, the bread is placed in the first container, which is then filled level full with seed. The seed is then emptied into the auxiliary funnel, and from this funnel flows evenly into the measuring vessel. From the height to which the seed rises on the graduated face of this vessel, the volume of the loaf may be read directly without calculation. Of polished brass with suitable support, graduated in cubic centimeters for loaves ranging from 1500 to 3000 cc in volume 32.50

6030. **ZINC PLATES**, for gluten testing, of thin sheet zinc, 2½ inches square. In sets of twelve, numbered 1 to 12..... Per set 1.00



FUNNELS, ALL KINDS

6100.	FUNNELS, Agateware.				
	No.	A	B	C	D
	Capacity, pints	1½	1	2	4
	Diameter, inches.....	3¾	4¼	5½	7½
	Each	\$0.30	.35	.40	.45
6102.	FUNNEL, Agateware, for pouring chemical salts into jars and wide mouth bottles. Size, 5 inches by 4½ inches.....				
					.25
	FUNNELS, Alundum Conical Filters, see Filtering Cones, Alundum.				
6106.	FUNNEL, Creosote, with stem graduated to 12 cc in 1/10 cc divisions, for estimating moisture in creosoted wood. (See Bulletin 134 of the Forest Service, United States Department of Agriculture)				
					2.00
6112.	FUNNELS, Glass, Bunsen, with angle of 60°, with ground rim and long slender stems ground to a point. Length of stem, about 150 mm.				
	Diameter, mm..	25	40	50	65
	Each .....	.18	.24	.25	.26
		.34	.36	.38	.60
		.65	.95	1.10	1.25
		1.70	2.25		
6114.	FUNNELS, Glass, Bunsen, same as No. 6112, with constriction in stem just below funnel to increase rapidity of filtration.				
	Diameter, mm.....	50	65	75	90
	Each .....	.30	.35	.45	.50
					1.00
6116.	FUNNELS, Glass, nest of 3; one each 7/8, 1 and 1½ inches in diameter.....				
					per nest
					.60
6118.	FUNNELS, Glass, without stem, for use in sugar analysis.				
	Diameter, mm.....			75	90
	Each .....			.70	.75
					.80
6120.	FUNNELS, Glass, with bulb in stem, for use in filtering through glass wool or cotton.				
	Diameter, inches.....			4½	5½
	Capacity, ounces.....			8	16
	Each .....			.85	1.05
6124.	FUNNELS, Glass Filter, so-called Carbon Filters, for use with Gooch crucibles.				
	No.	A	B	C	D
	Diameter at top inside, mm.....	25	30	35	40
	For Gooch crucible, No.....	2	3	4	..
	Each .....	.25	.30	.35	.40
6126.	FUNNELS, Glass, Ribbed, for rapid filtering, of heavy molded glass with smooth rim.				
	Diameter, inches.....	3¾	4¾	5¾	7¼
	Capacity, ounces.....	4	8	16	32
	Each .....	.20	.25	.35	.50
					gals. 1½
					1
					1.10
					2.00

FUNNELS, Filter Racks, see Filter Racks.



No. 6130.



Nos. 6132-4.



No. 6136.



No. 6144.



No. 6146.



No. 6152.



No. 6158.



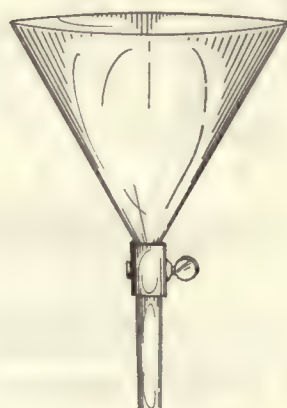
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No. 6162.



No. 6164.



No. 6166.

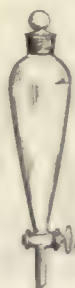
6130. **FUNNEL, Hot Water**, of heavy copper, single wall, with coil for heating with steam or hot water from a distance, when filtering inflammable liquids. Diameter inside, $5\frac{1}{2}$ inches. \$5.00
6132. **FUNNEL, Hot Water, Koch's**, of heavy polished copper, double walled, with detachable iron legs. Diameter inside, $5\frac{1}{2}$ inches. 7.00
6134. **FUNNEL, Hot Water, Koch's**, similar to No. 6132, but with single wall only. 4.50
6136. **FUNNEL, Hot Water, Plantamour's**, of tin, double walled. Diameter inside, $5\frac{1}{2}$ inches. 4.25
6138. **FUNNEL, Hot Water**, same as No. 6136, but made of heavy polished copper throughout. 6.50
6144. **FUNNELS, Porcelain, Buechner's**, glazed, with straight sides and fixed perforated plate.
- | No. | A | B | C | D | E | F | G | H |
|-------------------------------|-----|------|------|------|------|------|------|-------|
| Diameter outside, mm. | 50 | 60 | 80 | 100 | 150 | 200 | 250 | 300 |
| Height of walls, mm. | 20 | 25 | 30 | 40 | 60 | 90 | 100 | 120 |
| Each | .75 | 1.00 | 1.50 | 1.95 | 3.60 | 5.50 | 8.50 | 14.00 |
6146. **FUNNELS, Porcelain, Hirsch's**, glazed, with conical sides and fixed perforated plate. With handle.
- | No. | A | B | C |
|-----------------------|-----|------|------|
| Diameter, mm. | 86 | 120 | 175 |
| Each | .90 | 1.50 | 2.90 |
6152. **FUNNELS, Hard Rubber**, polished, with corrugated spout to allow escape of air.
- | No. | A | B | C | D |
|----------------------------|----------------|----------------|----------------|----------------|
| Diameter, inches | $3\frac{1}{4}$ | $4\frac{1}{4}$ | $5\frac{1}{4}$ | $6\frac{1}{4}$ |
| Capacity, ounces | 4 | 8 | 16 | 24 |
| Each | .45 | .60 | .80 | 1.10 |
6158. **FUNNEL, Separatory, Carnot's**, for ether separations in nickel determinations in iron and steel analysis. Capacity of body, 200 cc; capacity of bulb, 100 cc, with mark at 30 cc. (See Blair's Chemical Analysis of Iron, page 178). 5.00
6160. **FUNNELS, Separatory, cylindrical**, open top, with glass stop-cock and long stem.
- | No. | A | B | C | D |
|-----------------------|------|------|------|------|
| Capacity, cc. | 30 | 60 | 125 | 250 |
| Each | 1.25 | 1.45 | 1.90 | 2.20 |
6162. **FUNNELS, Separatory, cylindrical**, same as No. 6160, but with ground in glass stopper.
- | No. | A | B | C | D |
|-----------------------|------|------|------|---|
| Capacity, cc. | 60 | 125 | 250 | |
| Each | 1.50 | 1.90 | 2.50 | |
6164. **FUNNELS, Separatory, cylindrical**, same as No. 6162, but graduated in cc.
- | No. | A | B | C | D |
|-----------------------|---|------|------|---|
| Capacity, cc. | | 125 | 250 | |
| Each | | 3.00 | 5.00 | |
6166. **FUNNELS, Separatory, funnel shape**, 60° angle, of heavy glass, with glass stop-cock.
- | No. | A | B | C | D |
|-----------------------|------|------|------|---|
| Diameter, mm. | 100 | 150 | 200 | |
| Each | 2.80 | 4.50 | 5.50 | |



No. 6168.



No. 6170.



No. 6172.



No. 6174.



No. 6176.



No. 6180.



No. 6186.



No. 6178.



No. 6192.



No. 6194.



No. 6196.



No. 6198.

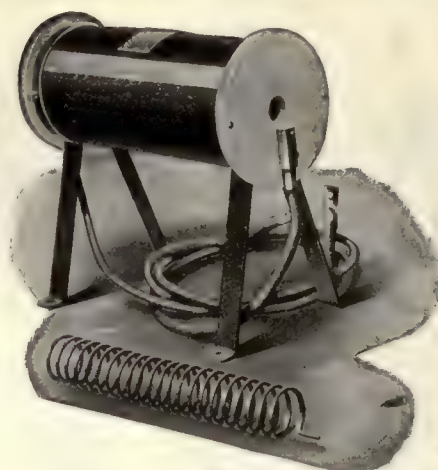


No. 6200.

- | | | | | | | | |
|-------|--|--------|------|------|------|------|------|
| 6168. | FUNNELS, Separatory, globe shape, light glass, with ground glass stopper, stopcock and long stem. | | | | | | |
| | Capacity, cc..... | 30 | 60 | 125 | 250 | 500 | 1000 |
| | Each | \$1.40 | 1.50 | 2.00 | 2.35 | 2.85 | 3.90 |
| 6170. | FUNNELS, Separatory, globe shape, of heavy molded glass with glass stopper, stop-cock and short stem. | | | | | | |
| | Capacity, cc..... | | | | 500 | 1000 | 2000 |
| | Each | | | | 5.40 | 7.20 | 9.00 |
| 6172. | FUNNELS, Separatory, Squibb's, pear shape, with ground in glass stopper. | | | | | | |
| | Capacity, cc..... | | | | 125 | 250 | 500 |
| | Each | | | | 2.30 | 3.50 | 4.30 |
| 6174. | FUNNEL, Separatory, Straus, for the estimation of lactic acid in gastric juice; with glass stop-cock. Capacity about 30 cc, with marks at 5 cc and 25 cc..... | | | | | | 2.00 |
| 6176. | FUNNEL, Separatory, for sulphonation test of creosote, with neck graduated to 5 cc in $\frac{1}{10}$ cc divisions. Capacity, 125 cc. (See Circular 112 of Forest Service, United States Department of Agriculture) | | | | | | 2.50 |
| 6178. | FUNNEL, Separatory, Terrapin, for immiscible liquids, as used by the Bureau of Chemistry, United States Department of Agriculture. With ground glass stopper and glass stop-cock. Capacity, 200 cc..... | | | | | | 3.00 |
| 6180. | FUNNEL, Separatory, Walter's, for delivering single drops. With ground glass stopper and glass stop-cock. Capacity, 60 cc..... | | | | | | 2.30 |
| 6186. | FUNNEL, Shaking, for estimating phenol in creosote. (See Bulletin 107 of Bureau of Animal Industry, United States Department of Agriculture) | | | | | | 2.50 |
| 6192. | FUNNEL TUBES, conical top, straight stem. | | | | | | |
| | No. | | | | | A | B |
| | Length, cm..... | | | | | 30 | 40 |
| | Each | | | | | .12 | .19 |
| 6194. | FUNNEL TUBES, thistle top, straight stem. | | | | | | |
| | No. | | | | | A | B |
| | Length, cm..... | | | | | 30 | 40 |
| | Each | | | | | .10 | .12 |
| 6196. | FUNNEL TUBE, thistle top, with bend in stem for safety trap. Length, 300 mm..... | | | | | | .18 |
| 6198. | FUNNEL TUBES, thistle top with bend and bulbs. Length, 300 mm. | | | | | | |
| | No. | | | | | A | B |
| | Number of bulbs..... | | | | | 1 | 2 |
| | Each | | | | | .20 | .30 |
| 6200. | FUNNEL TUBE, heavy, short stemmed, with bend and two bulbs, for use with gas generators. | | | | | | .40 |
| | FUNNEL SUPPORTS, see Supports. | | | | | | |



No. 6210.



No. 6218.

FURNACES, ALL KINDS

FURNACES, COMBUSTION, ELECTRICALLY HEATED

FURNACES, Combustion, Hoskins Electric, Type FD, for temperatures up to 1000°C. The heating element is of Chromel wire, wound in spiral grooves upon a special refractory tube 1¼x12 inches inside, and is surrounded by special packing material of high heat-insulating qualities. The element can be easily renewed by the user when burned out. Resistance wire is furnished in the proper length in spiral coils ready to be wound in the grooves upon the refractory tube. The entire renewal requires but a few minutes time and can be made if necessary while the tube is hot. A rheostat should be used to control the temperature. The furnace operates on either A. C. or D. C. with a maximum consumption of 550 watts. Widely used for determining carbon in iron and steel by the combustion method of Vanier, Johnson and others. With connecting cord and plug.

	No.	A	B
	For volts	110	220
6210.	Furnace only	\$25.00	25.00
6211.	Furnace with rheostat	33.50	33.50
6212.	RHEOSTATS for use with No. 6210 to control temperatures within safe working limits.		
	No.	A	B
	For volts	110	220
	Total resistance, ohms.....	10	40
	Each	8.50	8.50

Repair Parts for Furnace No. 6210.

6213.	REFRACTORY TUBE only, without wire.....		3.00
6214.	CHROMEL WIRE for rewinding.		

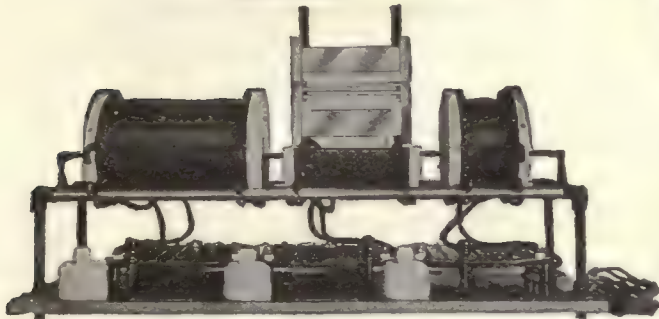
	No.	A	B
	For volts	110	220
	Each	3.50	3.50

FURNACES, Combustion, Hoskins Electric, Type FB, for temperatures up to 1100°C., for continuous operation. The heating element is a spiral of heavy Chromel wire, which radiates heat directly upon the combustion tube, enabling the furnace to be brought from cold to 1100°C. in only 30 minutes. As these furnaces operate on low voltages, they are best adapted for use on alternating currents in connection with a transformer. The temperature should be controlled by means of a rheostat. The element can be readily removed and replaced by the user in a few minutes in case of a burn out. Maximum power consumption, 1000 watts. Length of furnace, 12 inches; inside diameter of tube, 1¼ inches. Complete with connecting cord.

	No.	A	B
	For volts	110	220
6218.	Furnace only	25.00	25.00
6219.	Furnace with rheostat and transformer for 60 cycles	62.00	62.00
6220.	RHEOSTATS for use with No. 6218.		
	No.	A	B
	For volts	110	220
	Each	11.00	11.00
6221.	HEATING ELEMENTS for No. 6218.		
	No.	A	B
	For volts	110	220
	Each	5.00	5.00



No. 6226.



No. 6246.



No. 6234.

FURNACE, Combustion, Multiple Unit Electric, with tube $1\frac{1}{4} \times 12$ inches. The heating element is made up of two units with spiral coils in longitudinal grooves, either of which may be easily replaced by the user when burned out. Widely used for carbon determinations in iron and steel, heat treatment of small rods or tubes, and for Pyrometer calibration. Can be used interchangeably on 110 or 220 volts A. C. or D. C., by means of a selective plug supplied with furnace. Maximum power consumption, 560 watts. Complete with six feet of flexible cord and connecting plug. Height over all, 10 inches; shipping weight, 25 pounds.

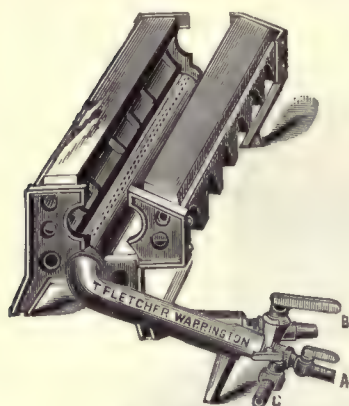
6226.	Furnace only	\$25.00
6227.	Furnace with rheostat (voltage must be specified)	33.50
6228.	HEATING UNITS for No. 6226, wound ready for use.....	each 3.75
6229.	REFRACTORY only of No. 6228.....	per unit 1.75
6230.	COILED WIRE only of No. 6228, for rewinding	per unit 2.00
6232.	ALUNDUM TUBE for use with No. 6226 in calibrating Pyrometers, 12x1 inch inside diameter	2.00

FURNACE, Combustion, Multiple Unit Electric, Hinged Design, permitting inspection of combustion tube at any time without removing the same or disconnecting the train. Operates interchangeably on 110 or 220 volts A. C. or D. C. Maximum power consumption, 750 watts. Shipping weight, 33 pounds. Height of furnace to center, $9\frac{1}{2}$ inches; length, 12 inches; inside diameter of tube, $1\frac{1}{4}$ inches.

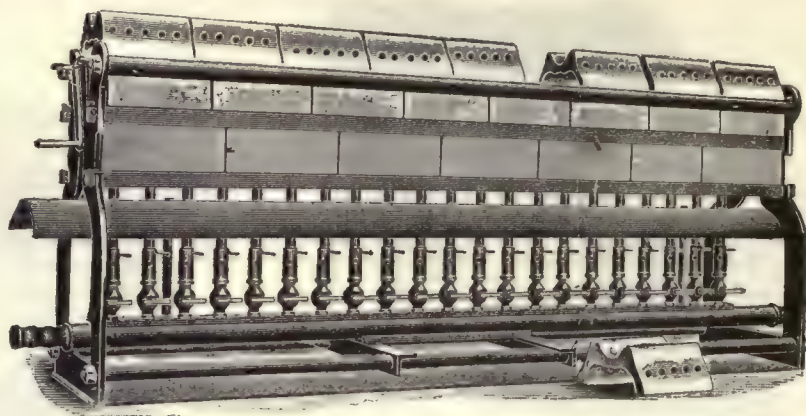
6234.	Furnace only	37.50
6235.	Furnace with rheostat (voltage must be specified)	47.50
6236.	HEATING UNITS for No. 6234, wound ready for use.....	each 5.00
6237.	REFRACTORY only of No. 6236.....	per unit 2.00
6238.	COILED WIRE only of No. 6236, for rewinding	per unit 3.00
6232.	ALUNDUM TUBE for use with No. 6234 in calibrating Pyrometers, 12x1 inch inside diameter	2.00

FURNACES, Organic Combustion, Multiple Unit Electric, consisting of three sections, each of which can be moved along the rails for use at different points and is operated independently by means of its switch and rheostat on the base. The upper half of each section can be raised independently for inspection without disconnecting the current. The heating units are in two sections, either of which may be easily and quickly replaced by the operator in case of a burn out. The temperature of 1000°C. can be reached in 40 minutes and held constant indefinitely by means of the rheostat. Rapid cooling is obtained by raising the upper section. The life of the heating elements is about 1000 hours at temperatures not exceeding 1100°C. The trough for supporting the combustion tube is of pure nickel supported at the ends and is free from contact with the furnace. Lengths of the three sections 4, 8 and 12 inches respectively; inside diameter of tube space, $1\frac{1}{4}$ inches; lateral adjustment of each furnace, $11\frac{1}{2}$ inches; distance from bench to center of furnace, 9 inches; length of combustion tube required, 48 inches; total length of base, 42 inches; width of base, $9\frac{1}{2}$ inches; height of furnace over all closed, $12\frac{1}{4}$ inches; height over all open, $17\frac{1}{2}$ inches; shipping weight, 135 pounds.

No.	A	B
For volts	110	220
Each	125.00	125.00



No. 6258.



No. 6262.

6247. **NICKEL TROUGH** only of No. 6246, to support combustion tube, 39½ inches long..... \$1.50

6248. **COMBUSTION TUBE, Pyrex**, for use with No. 6246. Length, 48 inches; diameter inside, 1 inch
..... 2.65

HEATING UNITS for No. 6246 (two required for each section).

No.	A	B	C
	small	medium	large
6249. For 110 volts, each.....	3.75	4.50	5.00
6250. For 220 volts, each.....	3.75	5.00	5.50

REFRACTORIES only of Nos. 6249 and 6250 (two required for each section).

No.	A	B	C
	small	medium	large
6251. For 110 volts, each.....	1.50	1.75	2.00
6252. For 220 volts, each.....	1.50	1.75	2.00

COILED WIRE for use with Nos. 6251 and 6252, for rewinding, sufficient for one unit.

No.	A	B	C
	small	medium	large
6253. For 110 volts, each.....	2.25	2.75	3.00
6254. For 220 volts, each.....	2.25	3.25	3.50

FURNACES, COMBUSTION, GAS HEATED

6258. **FURNACES, Combustion, Fletcher's**, for use with coal, gasoline or natural gas. Can be used with or without blast. Length of flame is adjustable at any part of furnace. Widely used for determining carbon in iron and steel. For blast purposes, use No. 1374 Foot Blower.

Length, inches.....	12	18	24
Each.....	15.00	19.00	22.00

6259. **FIRE-CLAY CASING BLOCKS** for Furnace No. 6258, 6 inches in length.....each 1.00

6262. **FURNACES, Combustion, Glaser's, improved form**. Provided with mica plates for watching the flame during combustion. The row of burners is movable in a furrow; the burners are provided with stop-cocks with separate long-handled key for turning and with nickel-plated air regulators. Complete with top plates of clay.

No.	A	B	C	D
Length, inches.....	14½	23	30	37
Number of burners.....	10	16	21	26
Each.....	37.50	50.00	60.00	75.00

6264. **FURNACES, Combustion, Glaser's**, same as No. 6262, but for gasoline gas.

No.	A	B	C
Number of burners.....	10	16	21
Each.....	45.00	60.00	70.00

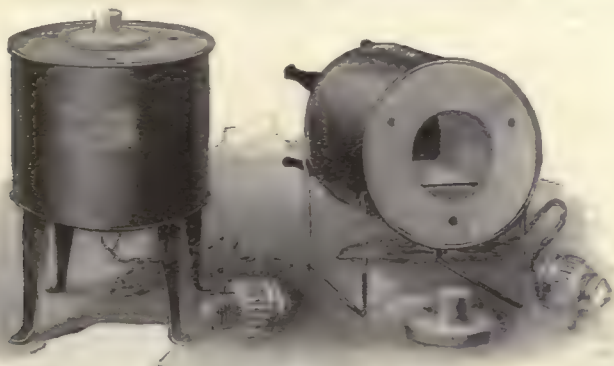
6265. **EXTRA TOP CLAYS** for Nos. 6262 and 6264.....each .60

6266. **EXTRA SIDE CLAYS** for Nos. 6262 and 6264.....each .25

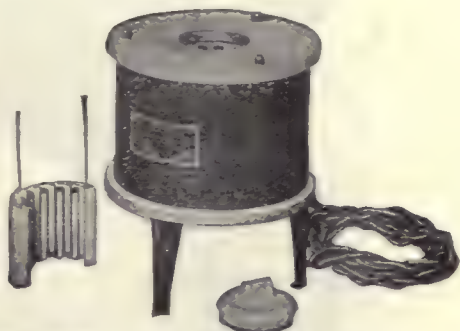
6267. **EXTRA GUTTERS** for Nos. 6262 and 6264.....each .15

6268. **EXTRA STOP-COCK KEY** for Nos. 6262 and 6264.....1.00

FURNACE, Simple Combustion, see No. 2066.



No. 6278.



No. 6290.

No. 6288.

FURNACES, CRUCIBLE, ELECTRICALLY HEATED

FURNACES, Combined Crucible and Muffle, Hoskins Electric, Type FD, with crucible chamber 2 inches in diameter by 2½ inches deep. Can be heated from room temperature to 1000°C. in 30 minutes. Temperature should be controlled by means of a rheostat. Requires no special wiring as furnace may be connected directly to lamp socket. Maximum power consumption, 370 watts. The heating unit is easily rewound by user in case of burn out, as the refractory is spirally grooved, and the resistance wire is furnished in a spiral coil ready to wind in the grooves. The entire renewal requires but a few minutes. Complete with connecting cord and plug. Shipping weight, 22 pounds.

		A	B
No.		110	220
6278.	Furnace only	\$20.00	20.00
6279.	Furnace with rheostat.....	28.50	28.50

Note:—Larger furnaces of the same type as No. 6278 can be supplied on short notice, but are not carried in stock. Send for special bulletin on Electric Furnaces.

6280. **RHEOSTATS,** for use with No. 6278 where it is desired to hold the temperature stationary at some point, or to control the variation in temperature, as in annealing.

		A	B
No.		110	220
Voltage		26.2	105
Resistance, ohms		8.50	8.50
Each		1.00	1.00

6281. **REFRACTORY** only for No. 6278, without wire

6282. **CHROMEL WIRE** only for No. 6278, for rewinding.

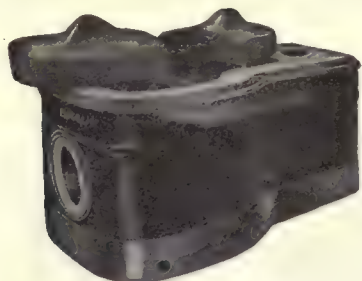
		A	B
No.		110	220
For volts		1.50	1.50
Each		1.50	1.50

Note:—The use of a Pyrometer with No. 6278 is desirable, as it will enable the operator to know at all times the exact temperature within the furnace chamber.

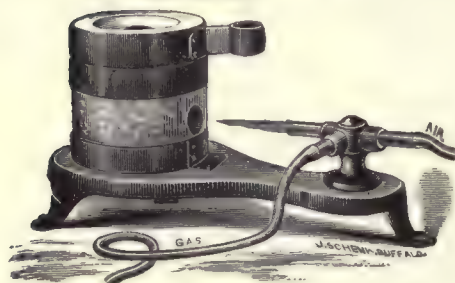
ELECTRIC PYROMETERS, see **Pyrometers.**

FURNACES, Crucible, Multiple Unit Electric, for temperatures up to 1000°C., for continuous duty. Adapted for melting metals, for determining the decalescent point of steel, and for calibrating pyrometers. Can be brought from cold to 1000°C. in 30 minutes. The heating element is in two units, either of which may be quickly replaced by the operator if burned out. Furnaces Nos. 82, 84 and 86 operate interchangeably on 110 and 220 volts. No. 80 is made for either voltage, but must be used with rheostat when ordered for 220 volts.

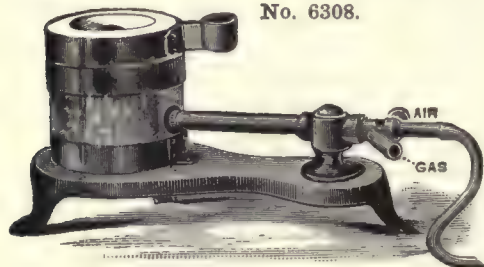
No.	80	80	82	84	86
For volts	110	220	110 & 220	110 & 220	110 & 220
Diameter inside, inches	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	3	3
Depth inside, inches	2 $\frac{1}{2}$	2 $\frac{1}{2}$	4	3 $\frac{1}{2}$	5
Diameter over all, inches	7 $\frac{3}{4}$	7 $\frac{3}{4}$	7 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$
Height over all, inches	8 $\frac{1}{2}$	8 $\frac{1}{2}$	10	11	12 $\frac{1}{2}$
Rating of current for 110 volts, amperes.	3.55	...	4.4	5.0	6.6
Rating of current for 220 volts, amperes.	...	3.55	2.2	2.5	3.3
Maximum power consumption, watts....	390	780	484	550	725
Kilowatt hours consumed in reaching 1400°F. (760°C.) from 75°F.....	.095	.325	.20	.23	.3
Kilowatt hours consumed in holding 1400°F. (760°C.) .....	.20	.40	.25	.325	.37
Shipping weight of furnace, lbs.....	16	16	22	25	30
Shipping weight with rheostat, lbs....	20	30	26	29	34
6288. Furnace only	20.00	.....	25.00	30.00	\$7.50
6289. Furnace with rheostat.....	28.50	30.00	33.50	38.50	49.50
6290. Heating units wound ready for use, each	2.75	2.75	3.50	3.75	4.75
6291. Refractory only	1.00	1.00	1.50	1.75	2.00
6292. Coiled wire only for rewinding.....	1.50	1.50	2.00	2.00	2.75



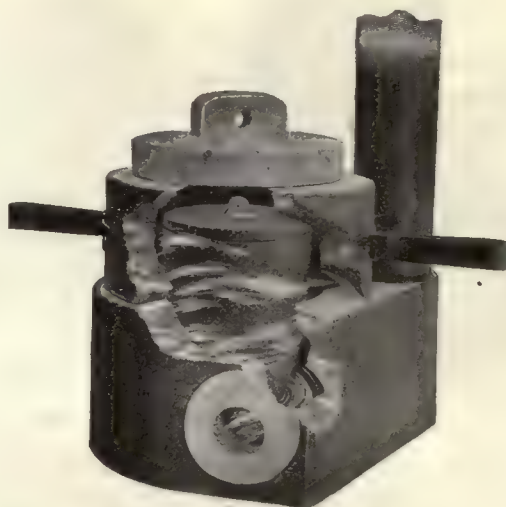
No. 6300.



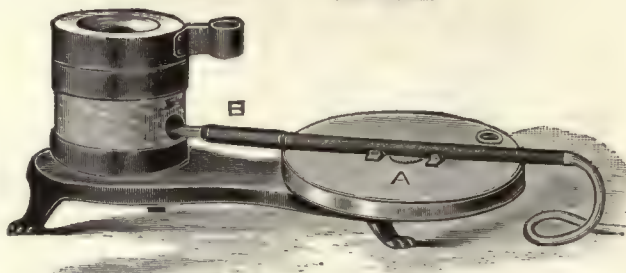
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No. 6309.



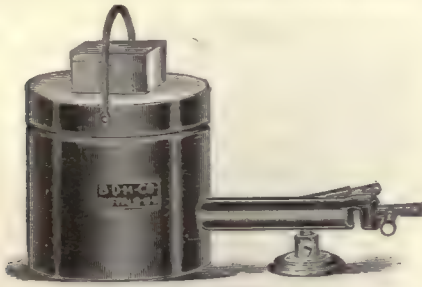
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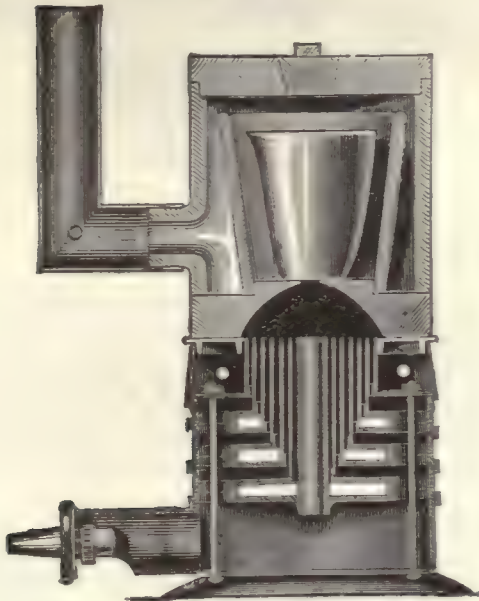
No. 6310.

FURNACES, CRUCIBLE, FOR GAS AND LIQUID FUELS

6300. **FURNACE, Crucible, Braun's Improved No. 8**, for gasoline or gas. Can be operated with 1½ inch Cary Gasoline Burner No. 2214A with a consumption of less than ½ gallon of gasoline per hour or with Braun Blast Burner No. 2150, with a consumption of about 150 cubic feet per hour. A removable shelf is provided for holding hot crucibles or covers. Capacity of furnace, 6 size F crucibles; shipping weight, 108 pounds..... \$23.00
6304. **FURNACE, Crucible, Case Melting No. 3**, for use with gasoline or oil. The flame blow-in is located so that the flame blows in on a tangent and does not hit the crucible until there is a complete combustion. The hot gases circle around the crucible, thereby preventing loss by cracking. Made in three sections; will take No. 7 plumbago crucible. Shipping weight, 50 pounds. Without burner..... 7.50
6305. **BURNER, Hydro-Carbon**, for use with No. 6304, for gasoline..... 6.50
- GASOLINE TANK OUTFIT** for No. 6304, see No. 2215.
6308. **FURNACE, Crucible, Fletcher's No. 40**, consisting of a crucible pot with lid and blowpipe mounted on cast iron base. Operates on ¾ inch supply of illuminating gas, using a 9A or 10A Foot Blower No. 1374 or 1376. Gas consumption, about 10 cubic feet per hour. Diameter of crucible pot, 4½ inches; height of crucible pot, 5¾ inches; height of furnace over all, 6½ inches; inside dimensions of crucible space: diameter, 2¾ inches; depth, 2½ inches; capacity of crucible, 10 ounces gold. Complete with one No. 00 clay crucible, but without blower 4.00
6309. **FURNACE, Crucible, Fletcher's No. 40A**, same as No. 6308, but with injector burner. Can be used with either coal, gasoline, or natural gas, requiring ¾ inch supply pipe and consuming 24 cubic feet per hour. Requires No. 9A or 10A Foot Blower to furnish blast. Complete with No. 00 clay crucible, but without blower..... 4.50
6310. **FURNACE, Crucible, Fletcher's No. 40B**, same as No. 6308, but for kerosene. Requires a 9A or 10A Foot Blower. Complete with No. 00 crucible, without foot blower..... 6.50
- Extra Parts for Furnaces Nos. 6308, 6309 and 6310.**
6311. **EXTRA FURNACE BODY**..... 1.25
6312. **EXTRA FURNACE COVER**..... .60
6313. **BURNER** only of No. 6308..... 1.75
6314. **BURNER** only of No. 6309..... 2.25
6315. **BURNER** only of No. 6310..... 4.50
6316. **STAND** only for Nos. 6308, 6309 and 6310, without burner or furnace body..... 1.00
6317. **PLUMBAGO CRUCIBLES**, No. 00.....each .65
6318. **CLAY CRUCIBLES**, No. 00.....each .08



No. 6322.



No. 6332.



No. 6326.



No. 6328.

6322. **FURNACES, Crucible, Fletcher's Perfected Injector.** Can be used on coal, gasoline or natural gas. Burner is in one casting, preventing nozzle from becoming overheated. Complete with one crucible, but without foot blower.

No.	41	41A
For crucible, No.	1	3
Diameter of crucible space inside, inches.	3½	4¾
Height of crucible space, inches.	3½	5½
Foot blower required to furnish blast, No.	9A	9B
Each	\$6.00	8.50

6323. **EXTRA CRUCIBLES** for No. 6322.

No.	1	3
Each	.70	.85

6326. **FURNACE, Crucible, Fletcher's Perfected Injector No. 41E,** same as No. 6322, but with double injector burner for kerosene. Requires No. 9B Foot Blower to furnish blast. Dimensions same as No. 6322, size 41. Complete with No. 1 clay crucible and double burner, but without foot blower.

6328. **FURNACE, Fletcher's Crucible and Muffle Combined,** for use with coal, gasoline or natural gas, from ½ or preferably ¾ inch supply. Requires No. 9B Foot Blower to produce blast. Will take No. 3 crucible or No. 6 when cover is reversed, or a muffle 3½x27½x6¼ inches. Height of furnace, 11 inches; outside diameter, 9½ inches; diameter of crucible space, 6 inches; height of crucible space, 6¼ inches; maximum gas consumption, 100 cubic feet per hour. Complete with injector burner, No. 3 clay crucible, and muffle.

6329. **EXTRA PLUMBAGO MUFFLES** for No. 6328. each 3.00

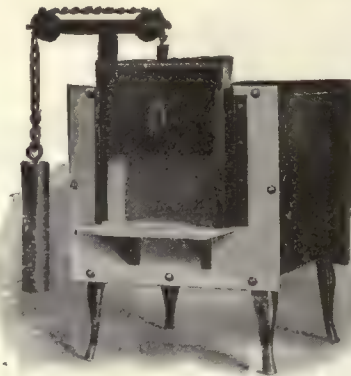
6332. **FURNACE, Crucible, Fletcher's Draft No. 15,** for crucibles up to 4x3½ inches; for use without blast. The adjustable burner is of special form furnishing a number of concentric flames, and will operate upon coal, gasoline or natural gas. With gas consumption of 50 cubic feet per hour, using ½ inch supply, it will rapidly melt a crucible of gold or silver. Height of furnace from table to top of lid, 18 inches; diameter of crucible pot, 7½ inches; height of crucible pot, 10 inches; diameter of flame space in furnace, 6¼ inches; height of flame space, 5½ inches. Complete with No. 3 clay crucible, clay cylinder and tongs, and 6 feet of pipe.

6333. **Extra Clay Crucibles** for No. 6332, size No. 3. each .20

6334. **Extra Clay Cylinders** for No. 6332. each .50



No. 6342.



No. 6350.

FURNACES, MUFFLE, ELECTRICALLY HEATED

FURNACES, Muffle, Hoskins Electric, Type FD, with heating element of Chromel wire wound in spiral grooves on a special refractory muffle, surrounded by packing material with high heating insulating qualities. Heating elements can be easily rewound by user in case of burn-out, as the wire is furnished in spiral coils of the proper length ready to wind in the grooves of the muffle. The entire renewal requires but a few minutes. A rheostat should be used to keep the temperature constant at the desired point. This furnace is useful for ash determinations, ignition of precipitates, incinerations, fusions, combustions, enameling, hardening and annealing small pieces of steel, melting alloys and metals, etc. With connecting cord and plug, but without rheostat.

	No.	201	202	203	204
	Inside dimensions of muffle space, inches.	3 1/8x2 1/2x7	4 1/4x3x8	5 1/4x3 3/4x12	7 1/2x5 1/4x14
	Maximum consumption, watts.....	850	1300	2100	3400
6342.	Furnace only	\$45.00	60.00	80.00	110.00
6343.	Furnace and rheostat.....	53.00	71.00	95.00	135.00
6344.	Muffle only without wire.....	6.00	9.00	12.50	18.50
6345.	Chromel wire for rewinding.....	5.00	8.00	13.00	19.00

In ordering, kindly specify voltage.

6346. **RHEOSTATS** for No. 6342, for controlling temperature.

For furnace, No.....	201	202	203	204
Each	10.00	13.00	17.00	27.00

In ordering, kindly specify voltage.

FURNACES, Muffle, Hoskins Electric, Type FB, for temperatures up to 1100°C. These furnaces are designed for heavy continuous duty, and are intended to operate on low voltages. They are therefore best adapted to operate on alternating current in connection with a transformer. Temperature control is secured by means of a rheostat in the case of No. 202 Furnace and by means of a regulating transformer in the case of No. 204. These furnaces are made for 110, 220 and 440 volts on either 60 or 25 cycles. Prices will be quoted upon request in the case of other voltages or frequencies.

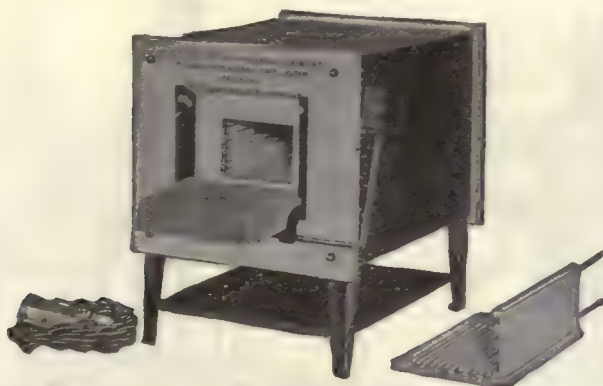
	No.	202	204
	Inside dimensions of muffle space, inches.....	4 1/4x3x9	7 3/8x5x12 1/2
	Maximum power consumed, watts.....	2750	6000
	Time required to raise temperature to 1100°C., minutes.....	90	90
6350.	Furnace only	90.00	125.00
6351.	Furnace with rheostat and transformer, 60 cycles	167.50	282.50
6352.	Furnace with rheostat and transformer, 25 cycles	187.50	322.50
6353.	Furnace with regulating transformer, 60 cycles	142.50	282.50
6354.	Furnace with regulating transformer, 25 cycles	162.50	322.50

6355. **EXTRA HEATING ELEMENTS, Hair Pin Type.**

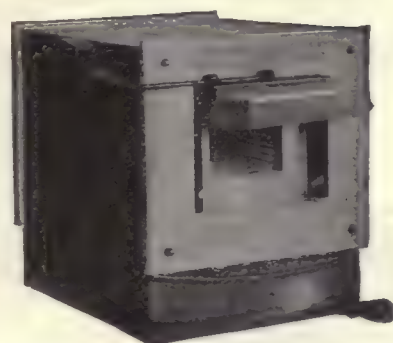
For furnace, No.....	202	204
Number of elements required.....	10	10
Each	1.25	3.00

In ordering, kindly specify voltage.

Note:—Furnaces of type FB with larger muffle space than those listed can be furnished on short notice, but are not carried regularly in stock. Prices quoted upon application.



No. 6362.



No. 6372.

FURNACES, Muffle, Multiple Unit Electric, for temperatures up to 955°C., for ignition of precipitates, ash determinations, fusions, heat treatment of steel, melting of alloys and metals, enameling, etc. These furnaces are of the multiple unit type, the heating element being made in four sections forming the sides of the muffle chamber. Either of these sections may be replaced independently of the others in case of a burn-out, and all may be reversed, if desired to change from open groove to closed face, the change increasing the time of heating only 3 per cent. on account of the high conductivity of the material. The superior heat insulation of the Multiple Unit Furnaces permits a larger muffle space for the same power consumption. These furnaces can be operated interchangeably on 110 and 220 volts by means of a selective plug furnished with the equipment. The counter-weighted doors are reversible for hinging at either top or bottom of opening, and are provided with $\frac{3}{4}$ inch air tight mica peephole. A $\frac{7}{8}$ inch pyrometer opening is provided in rear head. A rear door of the plug type with vent hole and handle can be supplied if desired, at additional charge. Complete with six feet of flexible leads and connector plug, and with metal shelf for holding crucibles, tongs, etc.

No.	50	52	54
Inside dimensions of muffle space, inches.	$3\frac{1}{4} \times 2\frac{1}{2} \times 7$	$4\frac{1}{4} \times 3 \times 10$	$5\frac{1}{4} \times 3\frac{3}{4} \times 12$
Outside dimensions of furnace, inches...	$12\frac{1}{4} \times 10\frac{1}{4} \times 14$	$15 \times 12\frac{1}{4} \times 16$	$17 \times 13\frac{3}{4} \times 18$
Shipping weight, furnace only, lbs.....	65	100	135
Shipping weight with rheostat, lbs.....	72	107	148
Rating of current for 110 volts, amperes.	9.1	13.1	18.8
Rating of current for 220 volts, amperes.	4.55	6.55	9.4
Maximum power consumption, watts....	1000	1440	2070
Kilo watt hours consumed in reaching 1400°F. (760°C.) from 75°C.....	.5	.72	1.2
Kilo watt hours consumed in holding 1400°F. (760°C.) .....	.39	.89	1.37
6362. Furnace only	\$45.00	60.00	80.00
6363. Furnace with rheostat.....	55.00	72.00	96.00
6364. Extra units for top or bottom, each....	3.25	5.25	7.50
6365. Extra units for side, each.....	2.50	3.50	5.50
6366. Refractory only for top or bottom, each..	1.75	2.75	3.50
6367. Refractory only for side, each.....	1.25	1.75	2.75
6368. Coiled wire only for rewinding top or bottom, each	1.50	2.50	4.00
6369. Coiled wire only for rewinding side, each.	1.25	1.75	2.75
6370. Rear doors, extra.....	5.00	5.50	6.00

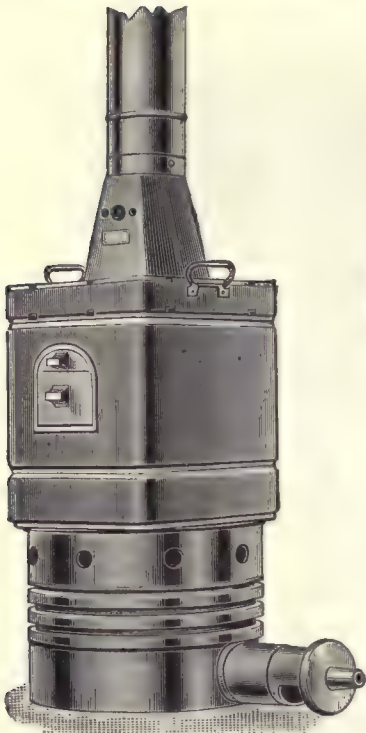
Note:—Always specify voltage when order includes rheostat.

6372. **FURNACES, Muffle, Multiple Unit Electric**, same as No. 6363, but with rheostat encased in housing below furnace body, convenient for use. This position also eliminates unsightly and dangerous wiring. Complete with six feet of flexible leads and connecting plug.

No.	60	62	64
Inside dimensions of muffle space, inches.	$3\frac{1}{4} \times 2\frac{1}{2} \times 7$	$4\frac{1}{4} \times 3 \times 10$	$5\frac{1}{4} \times 3\frac{3}{4} \times 12$
Outside dimensions of furnace, inches...	$13 \times 10\frac{1}{4} \times 13$	$14\frac{1}{2} \times 12\frac{1}{2} \times 16\frac{1}{2}$	$16\frac{1}{2} \times 13\frac{3}{4} \times 19$
Shipping weight, lbs.....	70	105	135
Each	63.50	82.00	107.50

In ordering, kindly state voltage.

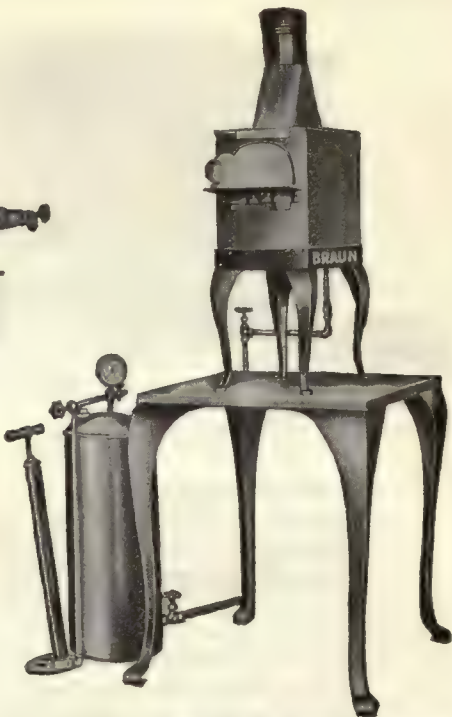
For **EXTRA UNITS AND PARTS** for No. 6372, see Nos. 6364-6370.



No. 6386.



No. 6394.



No. 6390. (Shown with complete outfit for use with gasoline.)

FURNACES, MUFFLE, GAS HEATED

6386. **FURNACES, Muffle**, for all work where exact temperatures are desired not exceeding the fusing point of copper. May be operated with coal gas, natural gas, or gasoline gas without alteration. Complete with muffle, dome, crucible tongs and 6 feet of chimney pipe and burner.

No.	3	4	5	6
Inside muffle space, inches.....	3x4x2 ³ / ₈	3 ⁷ / ₈ x5 ⁷ / ₈ x3	4 ⁷ / ₈ x6 ⁵ / ₈ x4	6x8 ¹ / ₂ x4 ⁷ / ₈
Gas pipe and tap required, inches.....	¹ / ₂	³ / ₄	1	1
Height from table to top of lid, inches..	16	19 ¹ / ₂	23	27 ¹ / ₄
Dimensions of clay parts, inches.....	7 ³ / ₄ x7 ³ / ₄ x8	10x9x11	11 ³ / ₄ x10 ³ / ₄ x14	14x15 ¹ / ₄ x17 ¹ / ₄
Maximum gas consumption, cubic feet..	72	96	120	225
Net weight, pounds.....	60	88	145	225
Each	\$20.00	26.00	40.00	50.00

6387. **EXTRA PLUMBAGO MUFFLES** for No. 6386.

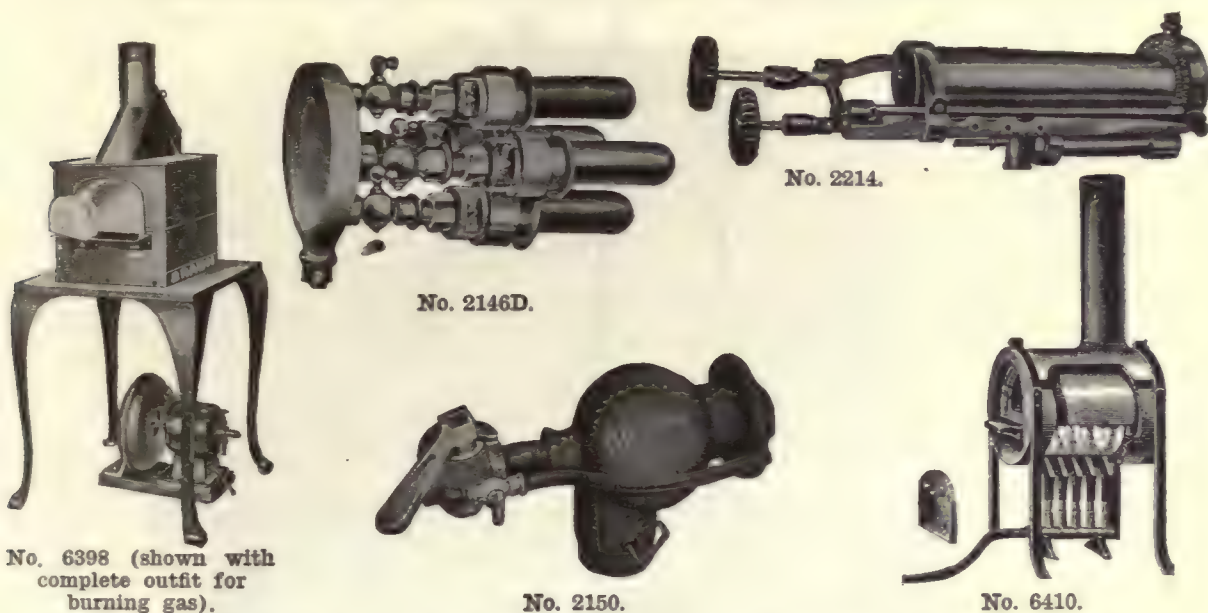
For furnace, No.....	3	4	5	6
Each	1.75	2.25	2.75	3.25

6388. **EXTRA DOMES** for No. 6386.

For furnace, No.....	3	4	5	6
Each	1.75	2.25	2.75	3.25

6390. **FURNACE, Muffle, Braun's No. 20**, for operation with gas or gasoline. Mounted on iron legs for convenience in operation. Size of muffle space, 6x12x4 inches. Shipping weight, 140 pounds. Complete with one muffle, hood, and two lengths of stove pipe, but without burner. If gasoline is used, Cary Burner No. 2214A, 1¹/₂ inch, is recommended; for gas, Vulcan Non-Blast Burner No. 2146D should be used. 23.00

6394. **FURNACE, Combination Muffle and Crucible, Braun's No. 40**, for gas or gasoline. The construction is such that the muffle is placed above the crucible compartment and the burner hole is so located as to force the flame in rotary motion around both sides of crucible compartment. The heat rising from the crucible chamber creates by suction a draft through the full length of the muffle. The cover is made in two sections to facilitate removal. The muffle draft for cupel work is obtained through a 1¹/₄ inch opening in jacket and lining at rear, and the amount of air admitted is controlled by a slide in the jacket. Dimensions of muffle space, 6x10x4 inches; capacity of crucible chamber, 10 size F or 6 size G crucibles; shipping weight, 235 pounds. Complete with one muffle, hood, two lengths of stove pipe, and covers, but without burner. Cary Burner No. 2214B, 2 inch, is recommended for use with this furnace when burning gasoline or Braun Blast Burner No. 2150 for use with gas 36.50



6398. **FURNACE, Muffle, Cary's, No. 33**, for gas or gasoline, with patent draft inducing attachment. Furnace is so arranged that special combustion chambers around the muffle distribute the fire and produce a uniform temperature in all portions of the muffle. Size of muffle, 8x12x5 $\frac{1}{4}$ inches; shipping weight, 250 pounds. Complete with one muffle, muffle door, hood with special draft attachment, and two lengths of stove pipe, but without burner. Cary Burner No. 2214B, 2 inch, is recommended for use with this furnace when burning gasoline, or Braun Blast Burner No. 2150 for gas. \$37.00
2150. **BURNER, Braun's Gas**, for use with Furnace No. 6398, for coal or natural gas. The construction is such as to secure a mixture of gas and air which insures perfect combustion. To secure proper blast a blower must be used. (See No. 6400.) Gas should be secured from a $\frac{3}{4}$ inch supply pipe. Shipping weight, 18 pounds. Complete with air and gas regulating valves. 15.50
6400. **BLOWER and Motor Combination**, for use with No. 2150. This outfit was especially designed for use with the Braun Gas Burner and is small, compact and self-contained. The motor is of a greater power than is actually required by the blower, consequently is free from over-heating. Shipping weight, 110 pounds. Without connecting pipe.

No.	A	B	C	D
	A. C.		D. C.	
For volts	110	220	110	220
Each	63.00	63.00	63.00	63.00

2146. **BURNERS, Braun's Vulcan Non-Blast**, for coal or natural gas, for use with Braun Furnaces. These are non-blast burners operating without noise and upon regular gas pressure. They are so designed as to secure a correct mixture of gas and air to produce the most intense heat. Temperatures up to 2100°F. have been obtained. Each tube consumes about 50 cubic feet of gas per hour. Complete with regulating valve for each burner.

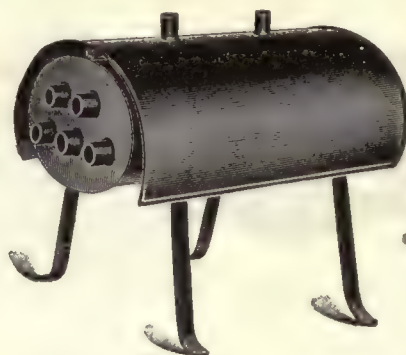
No.	A	B	C	D
Number of burner tubes.....	1	2	3	4
Each	3.25	7.25	10.50	12.50

2214. **BURNERS, Cary's Hydro-Carbon**, for use with Braun Furnaces, when using Tank Outfit No. 2215. The flame is clean and noiseless, and gives off no poisonous or noxious fumes. Easily generated, designed for continuous operation, and practically indestructible. Threaded to fit $\frac{1}{4}$ inch standard pipe.

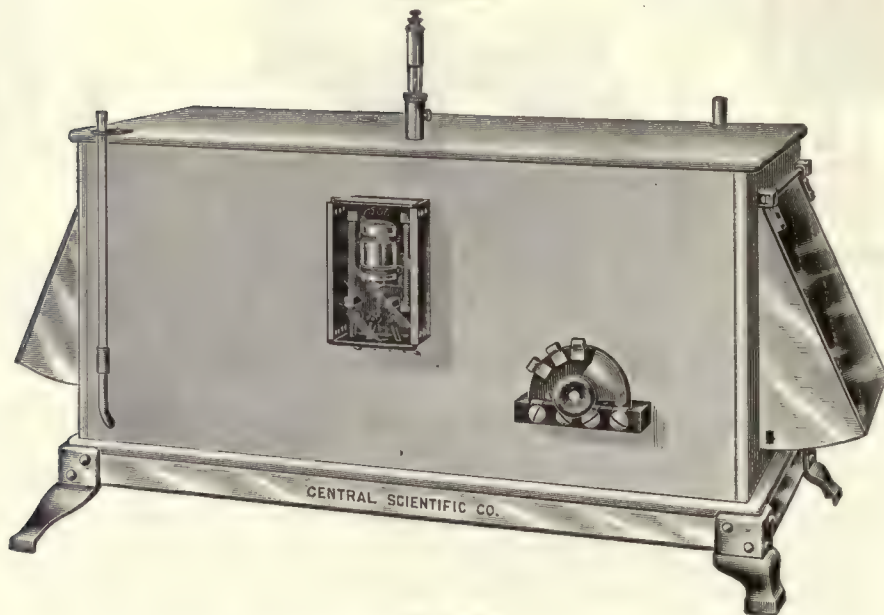
No.	A	B
Diameter, inches	1 $\frac{1}{2}$	2
Consumption of gasoline per hour at 35 pounds, gallons	$\frac{1}{2}$	1
Length of burner, inches.....	13 $\frac{1}{2}$	15 $\frac{1}{2}$
Shipping weight, pounds.....	5	7
Each	13.25	15.75

For **TANK OUTFIT** for use with No. 2214, see general heading **Burners, Gasoline and Kerosene**.

6410. **FURNACE, Muffle, Wiessnegg Type**, for ash determinations, incinerations, etc. Especially recommended for ashing in flour analysis where electric current is not available. Complete with four burners on one base, equipped with wing-tops to spread flame, and with muffle 7x4x3 inches inside 20.00
6411. **EXTRA MUFFLES** for No. 6410.....each 2.00



No. 6420.



No. 6416.

6416. **FURNACE, Tube or Bomb, DeKhotinsky Electrically Heated and Regulated**, for use in chemical, physical and mineralogical laboratories where constant temperature is imperative during long periods, and where reaction is desired under pressure in a sealed tube.

A rectangular copper container 1 mm in thickness with an end plate $1\frac{1}{2}$ mm in thickness is fitted with four tubes 35 mm inside diameter and 54.5 cm long, tinned inside. The container is enclosed in a box of asbestos-wood coated with white enamel, thoroughly baked on. The space (25 mm) between box and container is filled with heat insulating material (85 per cent. magnesia and 15 per cent. asbestos). The furnace rests on a nickel-plated stand with the usual incline of 50 mm per meter. Both ends of the furnace are provided with four electric heating units of 115 watts each, three of which may be conveniently added one by one, by means of the switch, which constitutes a part of the furnace. The fourth unit is electrically connected to our standard sensitive relay, which is automatically operated by a DeKhotinsky mercury thermo-regulator. Nickel-plated hoods, hinged at the top, are provided at the ends to prevent injury from flying glass in case of explosions.

By means of the thermo-regulator the temperature of the furnace can be maintained with a precision of $\frac{1}{10}$ degree C. within a temperature range from that of the surrounding atmosphere to 100 degrees C., if the container is filled with water; or up to 160 degrees C. if it is filled with Crisco or oil. Outside dimensions, 55 cm long by 24 cm wide by 25 cm high. Complete with water gage, constant water level, 6 feet of connecting cord and separable plug for attachment to any lamp socket.

No.	A	B	C	D
	A. C.		D. C.	
For volts	110	220	110	220
Each	\$112.50	115.00	110.00	112.50

Note:—In ordering A. C. Furnaces, kindly state number of cycles.

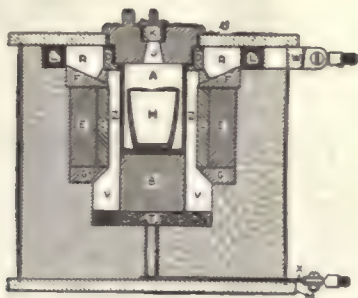
6420. **FURNACE, Tube or Bomb, Carius**, of iron, with openings for five tubes 20 inches long up to $1\frac{1}{4}$ inch in diameter..... 15.00



No. 6424. (Shown in use.)



No. 6436.



No. 6424. (Shown in section.)

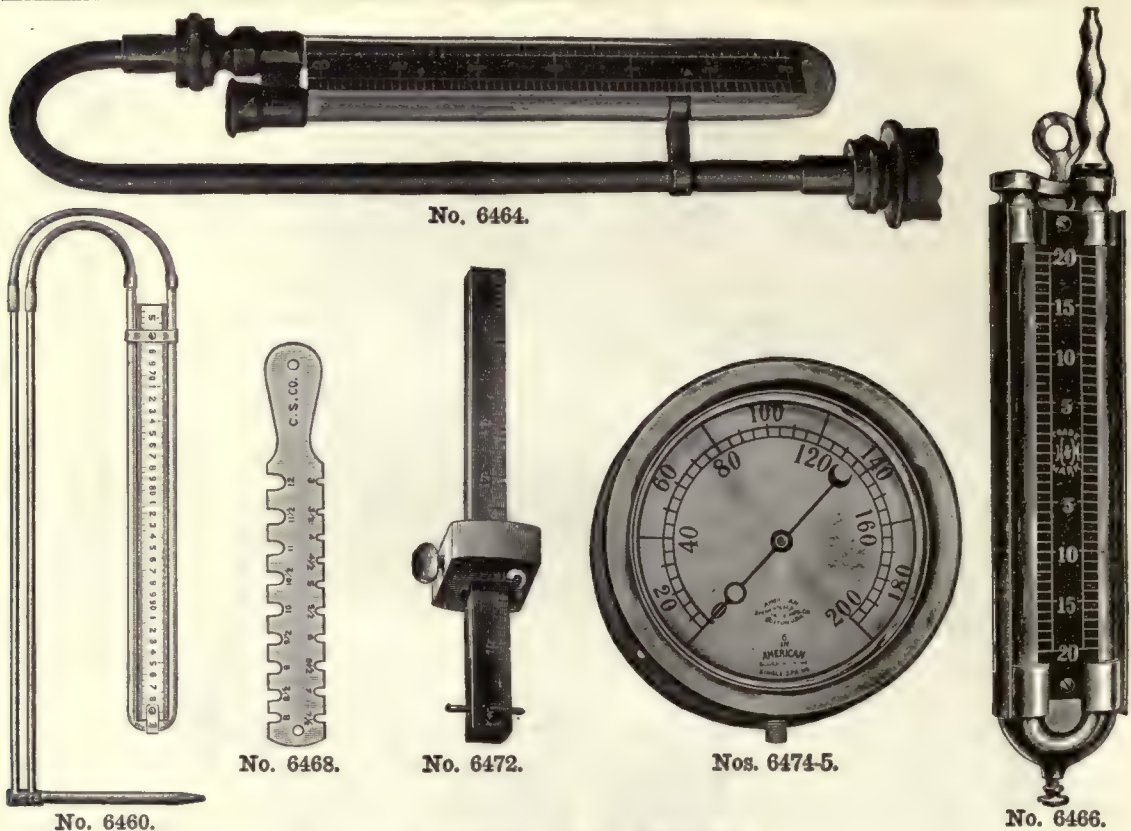
6424. **FURNACES, High-Temp Electric**, for temperatures from 500° to 1800°C. This is a low amperage furnace operating on either A. C. or D. C. up to 125 volts, a feature which should commend it to users who are not equipped with transformers or generators for producing low voltage and high amperage currents. The heating element is of the granular resistance type entirely surrounding the cylindrical heating chamber. Outside of the heating element is a concentric cylinder of refractory material surrounded by packing of heat insulating material, making a compact furnace of a high degree of efficiency. All parts are easily replaceable at little expense. With a maximum load of 40 amperes and a maximum power consumption of 2.75 kilowatts, the furnace can be brought to a temperature of 1600° C. in an hour. A switch board is furnished with voltmeter, ammeter, circuit breaker, line switch, and rheostat for controlling the temperature. Diameter of heated chamber, 2¼ inches; depth, 3¾ inches; outside diameter of furnace, 14½ inches; height over all, 19 inches. Dimensions of switch-board panel: 17 inches wide, 26 inches high, and 1 inch thick, requiring 9 inches of space for mounting. Complete with furnace, switchboard, 7 feet of asbestos covered flexible leads, 5 pounds of granular resistor material, and instructions for use, but without crucible.

No.	A	B
For volts	110 A. C.	110 D. C.
Each	\$205.00	195.00

6425. **GRANULAR RESISTOR MATERIAL** for No. 6424.....per 5 pounds 1.50
 6426. **SPECIAL CRUCIBLES** for No. 6424, capacity 60 cc.....each 1.25

Note:—Price of parts of No. 6424 for replacement furnished on request.

6436. **FUSEL OIL APPARATUS**, Bromwell, with stop-cock and glass stopper ground in, as used by the Association of Official Agricultural Chemists. Capacity of lower bulb, 20 cc, stem graduated from 20 to 22 cc in 1/50th cc divisions. (See Bulletin 107, Bureau of Chemistry, United States Department of Agriculture)..... 5.00



GAGES, ALL KINDS

- GAGES, Altitude, see Barometers.**
6460. **GAGE, Differential (Pitot Tube)**, as described by Prof. P. B. Woodworth of Lewis Institute, Chicago, at the 1915 Meeting of The C. A. S. & M. T. Outfit includes a brass Pitot tube of correct shape and dimensions, and a glass manometer tube suitably mounted on a scale ½ meter long graduated in both metric and English systems. With this tube accurate measurements of the flow of gases and liquids may be made. It may also be used as a velocity indicator on motor boats and in open streams of water, or in pipes conveying air, water or steam. A set of curves is furnished with the apparatus by means of which pressure values may be converted into velocities in units of feet per second or miles per hour for either air or water. \$12.00
6464. **GAGES, Draft, U-Tube or siphon form**, with metal fittings and removable brass bend and union. Scale graduated in 1/10 inch divisions.
- | | | | | | | |
|----------------|------|------|------|------|------|------|
| Length, inches | 4 | 6 | 8 | 12 | 18 | 24 |
| Each | 2.70 | 3.30 | 3.60 | 4.20 | 4.80 | 8.40 |
6466. **GAGE, Draft, pocket U-form**, armored for protection, with hose connecting piece and adjusting valve. With 6-inch scale graduated in 1/10 inch divisions. 7.50
- GAGE, Drill, see No. 4276.**
6468. **GAGES, Glass Tubing**, of steel, for gaging glass or metal tubing by outside diameters, with slots varying by ½ mm in width.
- | | | | | | | |
|-----------------|--------|---------|----------|----------|----------|----------|
| No. | A | B | C | D | E | F |
| For tubing, mm. | 3 to 8 | 8 to 12 | 12 to 16 | 16 to 20 | 20 to 24 | 24 to 28 |
| Each | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
- GAGES, Heat, see Pyrometers.**
6472. **GAGE, Marking**, of boxwood, adjustable, steel point, brass thumb screw and shoe. Six-inch scale by 16ths; 8¼ inches over all. .60

GAGES, PRESSURE

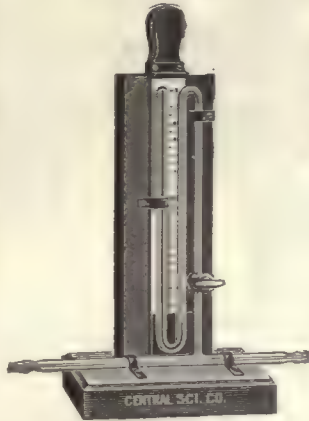
6474. **GAGE, Pressure**, commercial type, improved single spring form, for air, steam or water pressure; iron case with nickel-plated trimming, 3½-inch dial, range 0 to 30 pounds per square inch. Provided with stopcock, and nipple for attaching hose 6.00
6475. **GAGE, Pressure**. Same as No. 6474, but with range 0 to 100 pounds. 6.00
6476. **GAGE, Combination Pressure and Altitude**, especially valuable for work in hydraulics, for indicating the height and pounds pressure per square inch of water in pipe or reservoir. Provided with stopcock, and nipple for attaching hose.
- To raise a column of mercury 2.04 inches or to raise a column of water 27.67 inches requires one pound pressure.
- Iron case with nickel trimmings, 3½-inch dial, 0 to 30 lbs. and 0 to 70 ft. 7.50



Nos. 6480-2.



No. 6486.



No. 6500.



No. 6490.



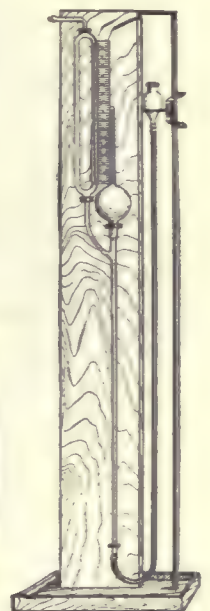
No. 6494.



No. 6496.



No. 6504.



No. 6510.

6478. **GAGE, Pressure, Standard**, so-called test gage. A gage of extreme accuracy, graduated by means of an open column of mercury and tested under the most severe conditions. Extremely sensitive under all pressures and guaranteed to be absolutely correct when shipped. Range, 0 to 100 lbs., with stopcock, and nipple for attaching hose. Entirely of brass, case nickel-plated. \$14.60

GAGE, Pressure, for gas cylinders. see Nos. 6530, 6544 and 6556.

6480. **GAGE, RAIN**, similar to United States Weather Bureau type, but smaller. A zinc vessel 3 inches in diameter by 13 inches long, in the top of which is placed a copper cup having an open top exactly 3 inches in diameter with sharp edge and projecting rim. The bottom of this copper cup is open and fits in the top of a brass tube 1 inch in diameter in which the amount of rain is measured. This tube is provided with an overflow opening and a wood rule graduated for reading the rainfall directly to $\frac{1}{100}$ th of an inch. 3.50
6482. **GAGE, RAIN, United States Weather Bureau Standard**, similar to No. 6480, but 8 inches in diameter and 23 inches long, with both inner and outer tubes of brass. Complete with measuring stick 10.00
6486. **GAGE, Screw Pitch**, with 24 pitches, 4 to 30 threads to the inch; V thread. 1.75
6490. **GAGE, Tube**, of steel. For measuring the internal diameters of tubing, etc. Scale range, 1 to 15 mm. Graduated to $\frac{1}{10}$ mm. 1.00
6494. **GAGE, VACUUM, or MANOMETER**, for use with air pumps which are provided with a $\frac{7}{16}$ -inch opening tapped with 16 threads to the inch. Enclosed in glass tube with oxidized scale 14 cm long, graduated in millimeters. Filled with mercury, ready to attach to pump. 7.00
6496. **GAGE, VACUUM, or MANOMETER**. To be used under any bell jar which is 8 inches or more high. Tube is mounted on a base with millimeter scale. Filled with mercury, ready for use. 1.80
6500. **GAGE, VACUUM, or MANOMETER**, of glass, with stop-cock and movable mirror scale graduated in millimeters for 13 cm above and below the zero line. Filled with mercury and mounted on a wood support. 15.00
6504. **GAGE, Vacuum**. Same type and description as No. 6474. Range 0 to 30 inches. 6.00
6506. **GAGE, Combination Pressure and Vacuum**, combining Nos. 6474 and 6504, showing both pressure and vacuum on one dial; $3\frac{1}{2}$ -inch dial, in iron case with nickel trimmings. 7.50
6508. **GAGE, Vacuum, Standard**. Same type and description as No. 6478. Range 0 to 30 inches. 14.60
6509. **GAGE, Combination Pressure and Vacuum, Standard**. Combines Nos. 6478 and 6508, showing both pressure and vacuum on one dial; $3\frac{1}{2}$ -inch dial. Entirely of brass, case nickel-plated. 17.75
6510. **GAGE, Vacuum, McLeod's**, for measuring high vacua, for use in connection with Cenco-Nelson and similar high vacuum pumps. Will read to 0.001 mm. Mounted on wooden stand, with directions for use. 45.00
- GAGES, Wind**, see Anemometers.



No. 6514A.



No. 6530.



No. 6540.

6514. **GAGES**, Wire, American standard, of best tempered steel.

No.	A	B
Sizes	0 to 36	5 to 36
Each	\$3.00	2.50

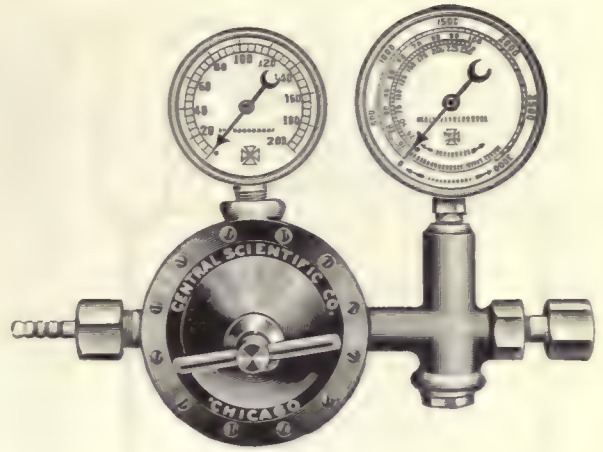
GALVANOMETERS, see **Electrical Instruments**.

GASES COMPRESSED IN CYLINDERS

6524. **GAS**, Ammonia, liquefied, in cylinders of 50 pounds.....per pound .50
6525. **CYLINDER** for No. 6524 extra (returnable for refilling only)..... 20.00
6528. **GAS**, Carbonic Acid, liquefied, in cylinders of 20 pounds, per pound..... .25
6529. **CYLINDER** for No. 6528 (returnable for credit, less a rental charge of 1 cent per day after 60 days) 30.00
- Note**:—If desired, name plate with name of institution will be attached without extra charge. In this case, the cylinder is returnable for refilling only.
6530. **REGULATOR**, Constant Pressure, for carbon dioxide tanks, for delivering carbon dioxide at any desired pressure from 5 to 300 pounds. Complete with regulator and gage reading to 300 pounds in 5-pound divisions..... 15.00
6532. **GAS**, Chlorine, liquefied, in cylinders of about 100 pounds.....per pound .25
6533. **CYLINDER** for No. 6532 (returnable for credit in good condition, less a rental charge of 50 cents per month after 90 days)..... 25.00
6536. **GAS**, Hydrogen, pure, compressed in steel cylinders.
- | | | |
|---------------------------|------|------|
| No. | A | B |
| Capacity, cubic feet..... | 25 | 50 |
| Price of gas..... | 2.50 | 5.00 |
6537. **CYLINDERS** for No. 6536 (returnable for credit in good condition, less a rental charge of 25 cents per week after 30 days).
- | | | |
|------------|-------|-------|
| No. | A | B |
| Each | 30.00 | 40.00 |
6540. **GAS**, Hydrogen (Illuminating Gas), for oxyhydrogen or lime light, in steel cylinders tested to 600 pounds pressure per square inch. The capacity is figured at a standard pressure of 225 pounds to the square inch. Complete with MacLachlan Patent Double Needle Valve, and with name plate engraved with name and address of institution.
- | | | | |
|-------------------------------------|-------|-------|-------|
| No. | A | B | C |
| Capacity, cubic feet..... | 25 | 35 | 40 |
| Dimensions of cylinder, inches..... | 10x34 | 12x36 | 12x42 |
| Per cylinder filled with gas..... | 18.75 | 20.00 | 21.25 |



No. 6544.



No. 6556.

6542. **GAS, Oxygen**, for oxyhydrogen or lime light, in steel cylinders tested to 600 pounds pressure per square inch. The capacity is figured at standard pressure of 225 pounds to the square inch. Complete with MacLachlan Patent Double Needle Valve, and with name plate engraved with name and address of institution.

No.	A	B	C
Capacity, cubic feet.....	25	35	40
Dimensions of cylinder, inches.....	10x34	12x36	12x42
Per cylinder filled with gas.....	\$21.85	24.35	26.25

6543. **CYLINDERS** for Nos. 6540 and 6542 (returnable for refilling only), refilled with oxygen or hydrogenper cubic foot .13

6544. **PRESSURE GAGE**, indispensable to users of oxyhydrogen, for measuring the amount of gas in a tank. Indicates both cubic feet and pounds pressure..... 6.00

6546. **GAS, Nitrogen**, compressed, in cylinders.

No.	A	B	C
Capacity, cubic feet.....	25	50	100
Price of gas.....	3.75	5.00	6.25

6547. **CYLINDERS** for No. 6546 (returnable for credit in good condition less a rental charge of 25 cents per week after 30 days.)

No.	A	B	C
Capacity, cu. ft.....	25	50	100
Each	18.00	26.00	42.00

6550. **GAS, Nitrous Oxide**, liquefied, in cylinders of 100 gallons of gas.....price of gas 3.50

6551. **CYLINDER** for No. 6550 (returnable for credit in good condition, less rental charge of 25 cents per week after 30 days)..... 6.00

6554. **GAS, Oxygen**, pure, in steel cylinders, under pressure of 1800 pounds per square inch.

No.	A	B
Capacity, gallons of gas.....	40	100
Size of cylinder about, inches.....	3½x14	4½x24
Price of gas.....	2.00	5.00

6555. **CYLINDERS** for No. 6554 (returnable for credit in good condition less a rental charge of 25 cents per week after 30 days), complete with wheel valve and yoke to permit attachment of rubber tubing.

No.	A	B
Each	7.50	13.50

6556. **REGULATOR. Constant Pressure**, for oxygen tanks, for maintaining a uniform pressure of gas up to 200 pounds per square inch, when delivered from high pressure cylinders. With two gages, one showing the pressure in the tank, the other the pressure delivered..... 35.00

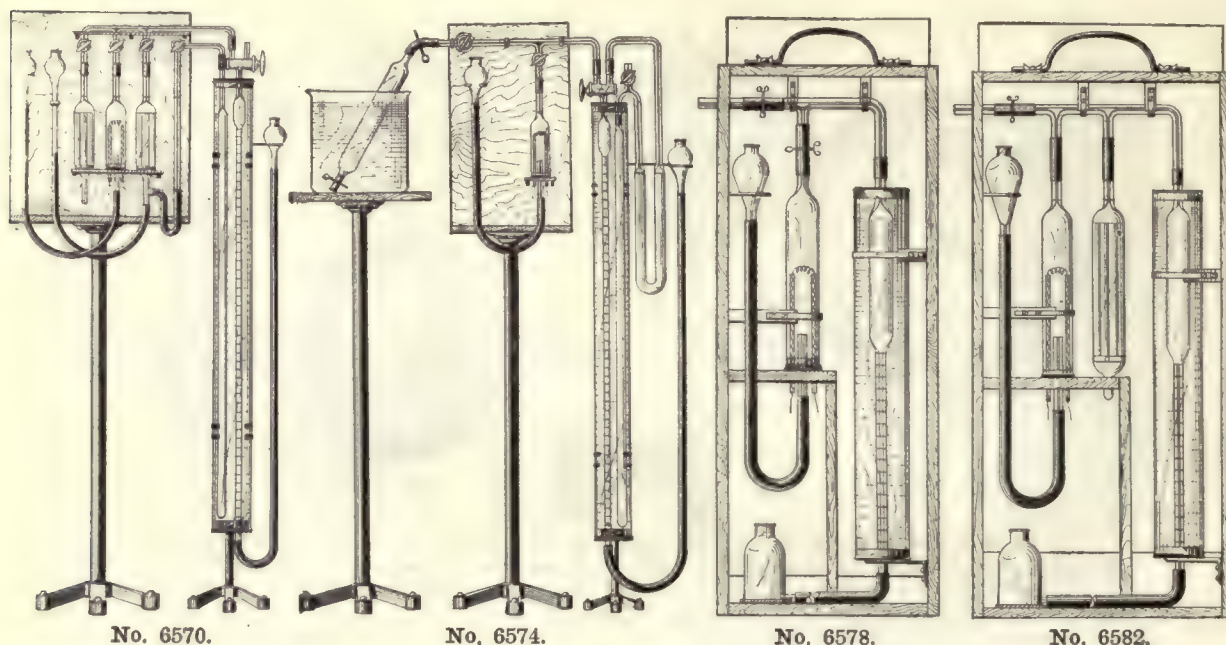
6557. **ADAPTER** for use with No. 6556, when used on small oxygen tanks..... 4.00

6558. **REGULATOR, Constant Pressure**, same as No. 6556, but with the smaller gage reading to 30 pounds of pressure delivered, instead of 200 35.00

6560. **GAS, Sulphur Dioxide**, in cast iron cylinders with valve, holding about 10 pounds, complete 6.00

6561. **CYLINDER** for No. 6560 (returnable for refilling only), refilled with sulphur dioxide... 3.00

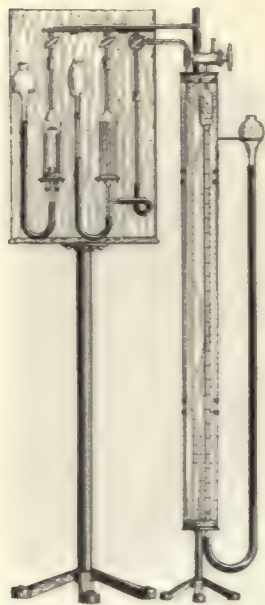
GAS ABSORPTION TUBES, see Absorption Tubes; Ammonia Absorption Apparatus.



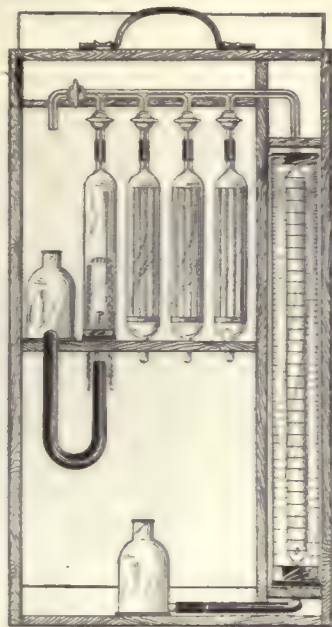
GAS ANALYSIS APPARATUS

GAS ANALYSIS APPARATUS, as developed by the United States Bureau of Mines and used by them in the examination and precise analysis of mine air, flue and furnace gases, natural gas, and exhaust gases from gas engines. (See Bulletins 42, 74 and 97, and Technical Papers 13, 14, 31 and 87 of the United States Bureau of Mines.)

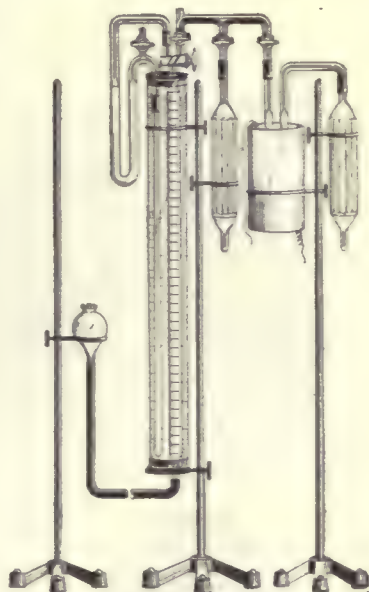
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|---|--|----------------|
| 6570. | APPARATUS FOR THE EXACT ANALYSIS OF MINE AIR, Laboratory Form. Complete with glass parts mounted as shown, with iron supports. (See Bulletin 42, of the United States Bureau of Mines, figure 7, page 17)..... | \$40.00 |
| 6571. | GLASS PARTS only for No. 6570..... | 25.00 |
| 6574. | APPARATUS FOR THE EXACT DETERMINATION OF METHANE, Laboratory Form. With this apparatus an analysis may be made in 10 minutes with an accuracy of 0.01 to 0.02 per cent. Complete with water-jacketed measuring burette, temperature compensating device, slow combustion pipette, manifold with two stop-cocks, manometer and leveling bulb, mounted as shown with iron supports, but without beaker or sampling tube. (See Bulletin 42, figure 11, page 31.) | 38.00 |
| 6575. | GLASS PARTS only for No. 6574..... | 20.00 |
| 6578. | APPARATUS FOR THE DETERMINATION OF METHANE IN MINE AIR, Portable Form. Determinations may be made with an accuracy of 0.1 per cent. Complete as shown with glass parts mounted in polished wooden carrying case with sliding doors. (See Bulletin 42, figure 13, page 34)..... | 27.50 |
| 6579. | GLASS PARTS only for No. 6578..... | 9.00 |
| 6582. | APPARATUS FOR THE DETERMINATION OF CARBON DIOXIDE AND METHANE, Portable Form , similar to No. 6578, but with the addition of an absorption pipette for carbon dioxide. Complete as shown, in polished wooden carrying case, with sliding doors. (See Bulletin 42, figure 14, page 36)..... | 29.00 |
| 6583. | GLASS PARTS only for No. 6582..... | 10.00 |
| 6586. | APPARATUS FOR THE EXACT DETERMINATION OF CARBON DIOXIDE AND METHANE, Laboratory Form. With this apparatus an analysis can be made in 15 minutes with an accuracy of 0.01 per cent. Complete as shown with iron supports. (See Bulletin 42, figure 15, page 38)..... | 35.00 |
| (For illustration of No. 6586, see page 277.) | | |
| 6587. | GLASS PARTS only for No. 6586..... | 21.00 |



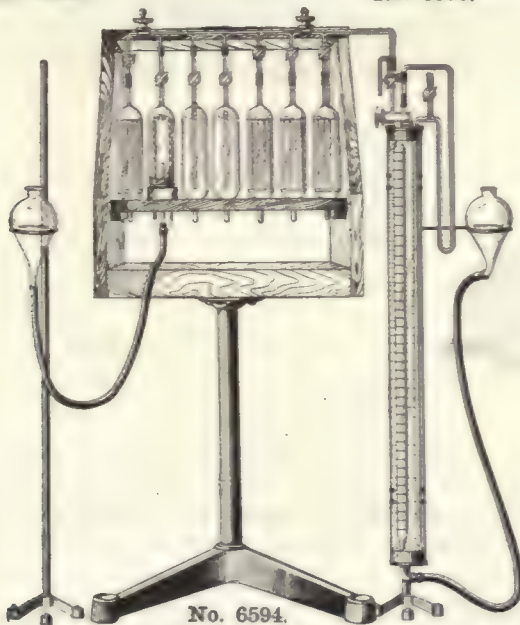
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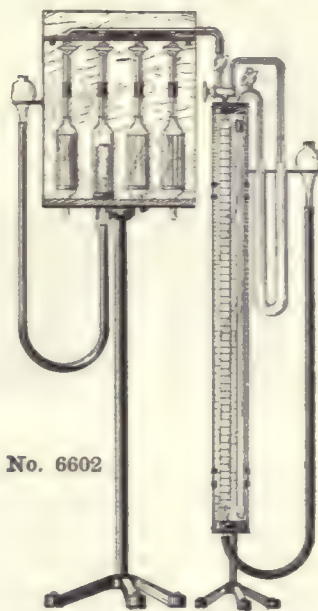
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No. 6598.

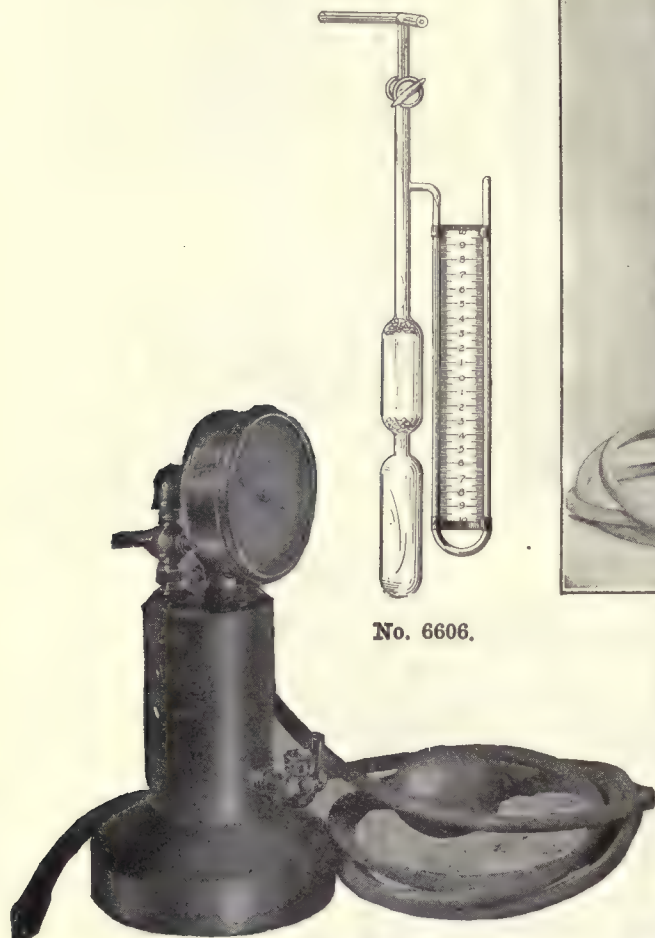


No. 6594.

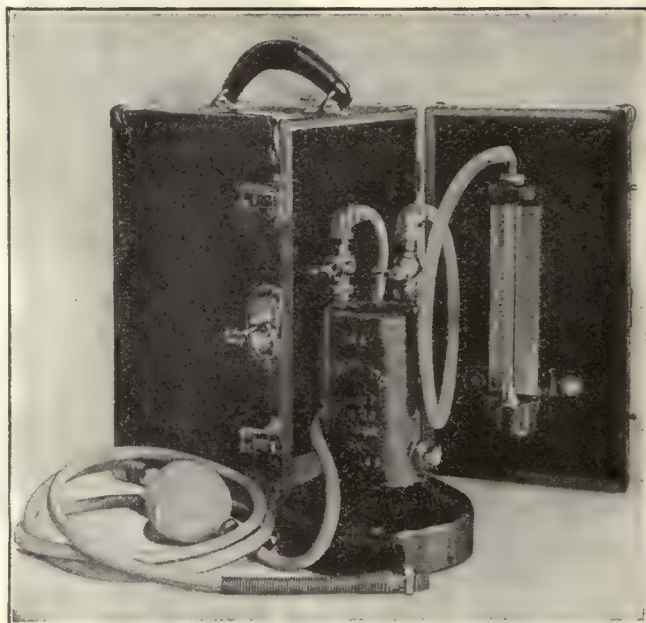


No. 6602

6590. **MODIFIED ORSAT GAS ANALYSIS APPARATUS, Portable Form**, for analyzing mine gases to an accuracy of 0.2 per cent. The absorption pipettes are filled with glass rods. Complete as shown in polished wooden carrying case. (See Bulletin 42, figure 16, page 39).... \$42.50
6591. **GLASS PARTS** only for No. 6590..... 25.00
6594. **APPARATUS FOR THE ANALYSIS OF GAS MIXTURES, CONTAINING CO₂, C₂H₄, O₂, CO, H₂, CH₄, C₂H₆, and N₂. Laboratory Form**. Complete with 7 pipettes including slow combustion pipette, water-jacketed measuring burette, compensating device, manifold tube with four stop-cocks, and leveling bulb, mounted in wooden case with iron supports. (See Bulletin 42, figure 17, page 43)..... 85.00
6595. **GLASS PARTS** only for No. 6594..... 55.00
6598. **APPARATUS FOR THE DETERMINATION OF HYDROGEN, Laboratory Form**, by means of copper oxide or palladium asbestos. Complete with water-jacketed burette, compensating device, leveling bulb, palladium asbestos tube, two absorption pipettes, manifold with three stop-cocks, and iron supports, but without heater for the palladium asbestos tube. (See Bulletin 42, figure 18, page 54)..... 40.00
6599. **GLASS PARTS** only for No. 6598..... 30.00
6602. **APPARATUS FOR ANALYZING NATURAL GAS, Laboratory Form**, complete as shown, with iron supports. (See Bulletin 42, figure 23, page 78)..... 50.00
6603. **GLASS PARTS** only for No. 6602..... 35.00



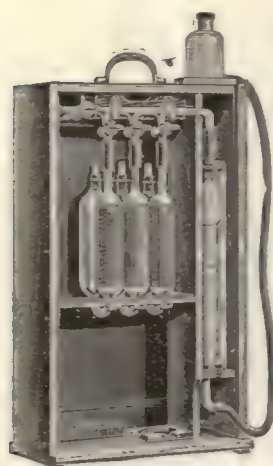
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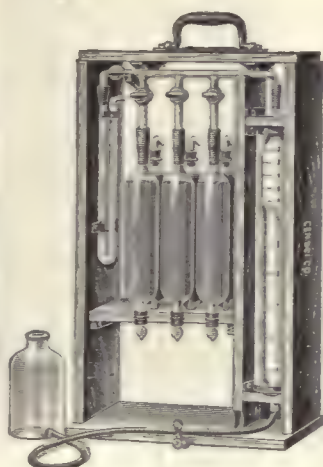
No. 6614.

No. 6612.

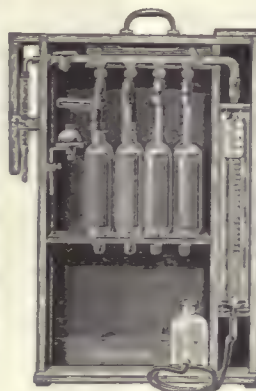
6606. **GAS ANALYSIS APPARATUS**, Burrell's, for determining benzene or gasoline vapor in gas mixtures by the freezing method. (See Journal of Industrial and Engineering Chemistry, Vol. VII, No. 2, for February 1915, page 112; and Technical Paper 87, of the United States Bureau of Mines, page 3)..... \$10.00
6612. **GAS ANALYSIS APPARATUS**, Dwights' CO₂ Indicator (Patent Applied for), for determining the percentage of carbon dioxide in flue gas and other mixtures. The outfit consists of a cast metal tank with reservoir in the base holding enough solution for 300 tests. The tank is provided with special inlet valve with stop-cock, and an aneroid gage reading directly in percentage of CO₂, in ¼ per cent. divisions. The test is practically instantaneous, requiring only 1 minute to complete. Complete as described with 6 feet of rubber tubing and pressure bulb 25.00
6613. **TRAVELING CASE** for No. 6612, covered with karatol grain leather, plush lined, with handle and nickel-plated trimmings, and with lock and key..... 3.00
6614. **GAS ANALYSIS APPARATUS**, Dwights' CO₂ Indicator (Patent Applied for), same as No. 6612, but with mercury gage mounted on the door of the carrying case, for obtaining the percentage of CO₂. The gage is specially designed to prevent spilling of mercury and is provided with an adjustable scale enabling the mercury level to be brought to zero when beginning a test. Complete as described with 6 feet of rubber tubing and pressure bulb, leather covered carrying case, plush lined, with handle, nickel-plated trimmings, and with lock and key. 28.00



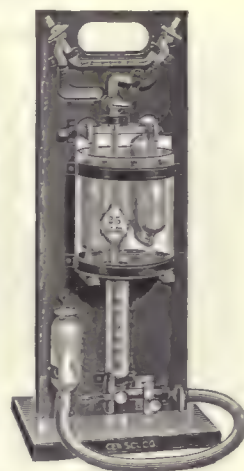
No. 6628.



No. 6632.



No. 6636.



No. 6650.

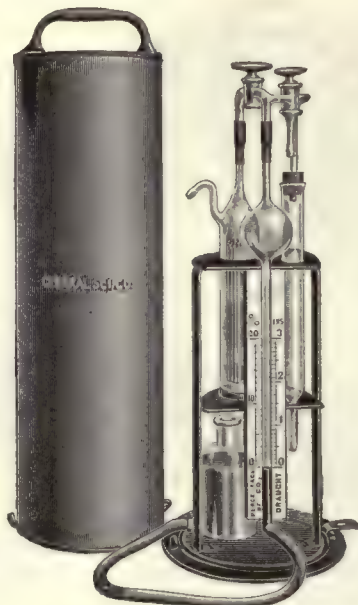
6628. **GAS ANALYSIS APPARATUS, Orsat-Muencke**, for the analysis of CO_2 , CO , and O_2 , especially adapted for furnace and flue gases. Consists of three absorption pipettes, manifold tube with four stop-cocks, measuring burette with water jacket, and aspirator bottle. Complete in portable polished wooden case..... \$35.00
6629. **EXTRA MANIFOLD TUBE** for No. 6628 with four stop-cocks..... 9.50
6632. **GAS ANALYSIS APPARATUS, Orsat-Fischer**, designed for portability. Similar to No. 6628, but about half the size, with drying tube inside case, attached to manifold. Complete with three pipettes, in portable polished wooden case..... 35.00
6633. **EXTRA MANIFOLD TUBE** for No. 6632, with four stop-cocks..... 9.50
6636. **GAS ANALYSIS APPARATUS, Orsat-Lunge**, similar to No. 6628, but with four pipettes and bent palladium tube with lamp, for separate estimation of hydrogen. Complete with drying tube, in portable polished wooden case..... 42.50
6637. **EXTRA MANIFOLD TUBE** for No. 6636, with five stop-cocks..... 12.00
6638. **EXTRA BENT PALLADIUM TUBE** for No. 6636 4.00

Extra Parts for Orsat Gas Apparatus Nos. 6628, 6632 and 6636.

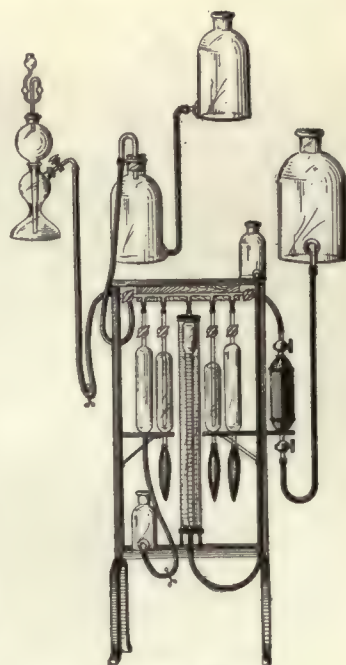
6640. **ABSORPTION PIPETTE**, plain..... 2.00
6641. **ABSORPTION PIPETTE**, filled with glass tubes 2.50
6642. **ABSORPTION PIPETTE**, filled with glass tubes and copper spirals..... 3.50
6643. **MEASURING BURETTE** only without water jacket 5.50
6644. **WATER JACKET** only for measuring burette 1.25
- 1614B. **ASPIRATOR BOTTLE**, 8 ounces..... .70
6645. **SOFT RUBBER BAG** for attaching to pipettes (for illustration, see page 428)..... .60
6832. **RUBBER ASPIRATOR BULB** with two valves and rubber connections (see page 428)... .60
6650. **GAS ANALYSIS APPARATUS, Petterson-Palmquist**, for determining small quantities of CO_2 in air. This is the standard laboratory apparatus recommended by the American Public Health Association for investigations of ventilation in schools, factories, public buildings, etc. Complete in polished wooden case. (See American Public Health Journal, Vol. VII, No. 1, for January 1917)..... 55.00



No. 6654.



No. 6660.

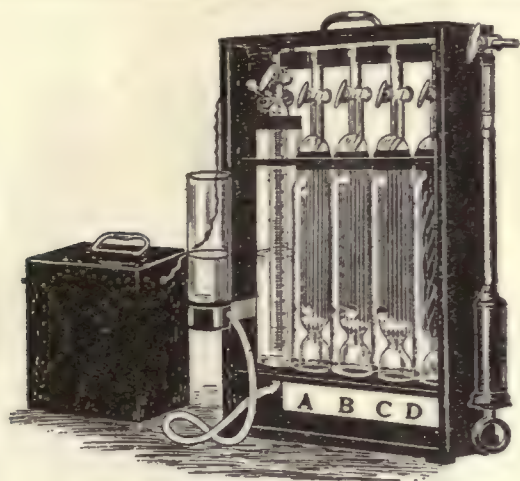


No. 6664.

6652. **GAS ANALYSIS APPARATUS, Portable Orsat**, for the determination of CO_2 , CO and O_2 . This instrument is very light and compact, having only half the weight and one fourth the volume of the usual form, and can be shaken bodily during an analysis, thus increasing the rapidity of the absorption. Complete with three absorption pipettes of special form, water jacketed measuring burette with stripe to facilitate reading, manifold with four stop-cocks, filtering tube, aspirator bottle and rubber bags, mounted on metal stand with metal cover. Height over all, 15 inches; diameter, $5\frac{1}{2}$ inches; total weight charged ready for use, 6 pounds.. 27.50
6654. **GAS ANALYSIS APPARATUS, Portable Orsat**, same as No. 6652, but with only two absorption bulbs, for CO_2 and O_2 \$25.00
6656. **GAS ANALYSIS APPARATUS**, same as No. 6652, but with four absorption bulbs, for CO_2 , CO , O_2 and H_2 32.00
6657. **ASPIRATING PUMP**, for use with Nos. 6652, 6654 and 6656..... 1.00
6660. **GAS ANALYSIS APPARATUS, Portable Boiler Tester**, for determining the draft and percentage of CO_2 in flues. Consists of a special measuring burette which is also used as a draft gage, an absorption pipette of special form filled with glass tubes, filter tube and leveling bottle, mounted on metal stand with metal cover. Height of case, 14 inches; diameter, 5 inches; weight, 4 pounds..... 17.50
6664. **GAS ANALYSIS APPARATUS, United States Steel Corporation Official Type**, as designed by the Chemists' Committee for the analysis of flue and furnace gases. Complete as shown, with water-jacketed measuring burette, manifold tube with two stop-cocks, four pipettes with stop-cocks, two leveling bottles, pint Kipp's generator, two 2 liter and one 4 liter aspirator bottles, overflow bottle for explosion pipette, rubber bags, and metal sampling tube with brass stop-cocks, mounted on hardwood stand, with directions for use. (See Metallurgical and Chemical Engineering, Vol. IX, 1911, page 303; and "Methods for the Technical Sampling and Analysis of Gases," of the United States Steel Corporation)..... 80.00

Extra Parts for No. 6664.

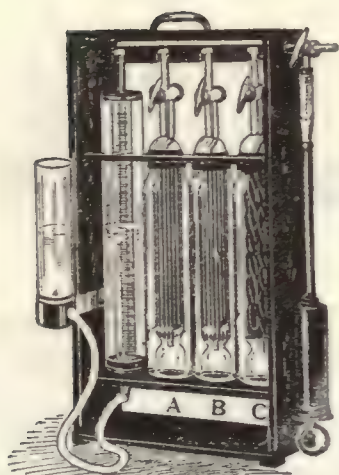
6665. **MANIFOLD TUBE** with two stop-cocks..... 10.50
6666. **EXPLOSION PIPETTE**..... 5.00
6667. **ABSORPTION PIPETTE** for liquids..... 6.50
6668. **ABSORPTION PIPETTE** for solids..... 5.00
6669. **MEASURING BURETTE** with water jacket..... 10.50



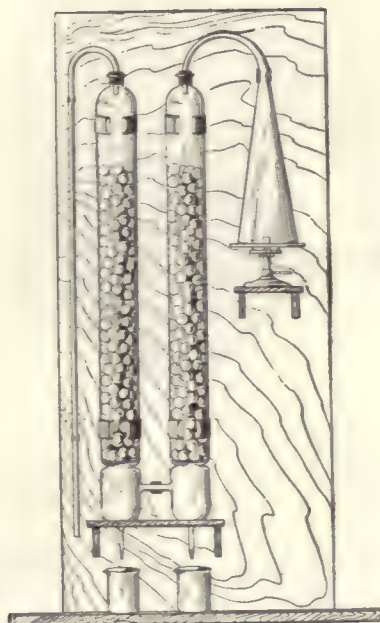
Nos. 6676-7.



No. 6692.

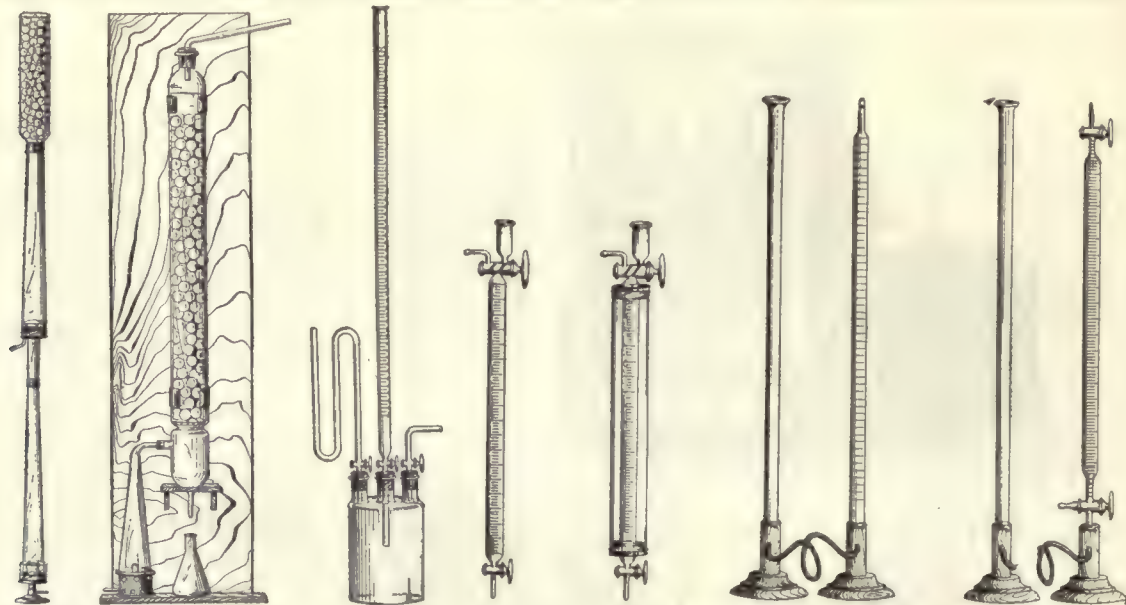


No. 6678.



No. 6694.

6676. **GAS ANALYSIS APPARATUS, Williams' Improved, Model A**, for the complete analysis of combustible gases, with special form of bubbling pipettes designed to increase the rapidity of absorption and to decrease the possibility of breakage. Complete with four special bubbling pipettes with stop-cocks, filled with glass tubes, manifold tube, water-jacketed measuring burette with stop-cock, leveling bottle, three-way stop-cock and aspirator pump, in polished oak case lined with rubber. Height, $17\frac{1}{2}$ inches; width, 12 inches; depth, 4 inches \$50.00
6677. **PORTABLE EXPLOSION COIL** for use with No. 6676 in determining methane. Complete with batteries in polished oak case..... 7.50
6678. **GAS ANALYSIS APPARATUS, Williams' Improved, Model B**, for analysis of flue gases, similar in construction to No. 6676, but with three bubbling pipettes for determining CO_2 , CO, and O_2 . Complete with three pipettes with stop-cocks and glass tubes, manifold tube, water-jacketed burette with stop-cock, leveling bottle, three-way stop-cock and aspirating pump, in polished oak case, lined with rubber. Height, $17\frac{1}{2}$ inches; width, $9\frac{1}{2}$ inches; depth, 4 inches 35.00
- GAS APPARATUS, Bunsen-Fresenius**, for chlorine, see **Chlorine Absorption Apparatus**.
6692. **GAS APPARATUS, Chancel's**, for determining the specific gravity of gases. With ground in stop-cock tube and side arm..... 4.50
6694. **GAS APPARATUS, Elliotts' Improved Form**, for determining sulphur in illuminating gas, as described in Technologic Paper No. 20 and Circular No. 48 of the United States Bureau of Standards. Complete with burner, trumpet tube, towers filled with glass marbles and connecting tubes, mounted on support, without beakers 25.00



No. 6696.

No. 6698.

No. 6704.

No. 6730.

No. 6732.

No. 6736.

No. 6740.

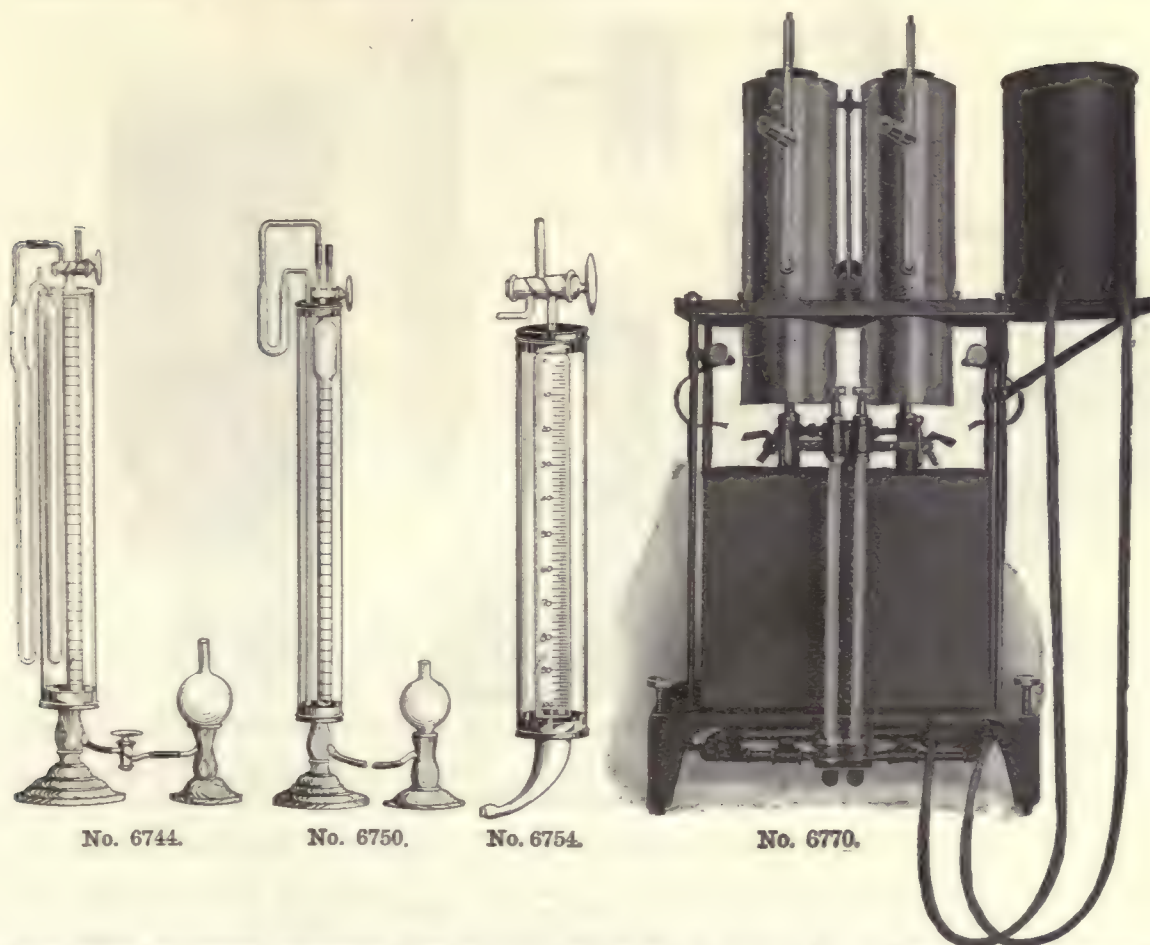


No. 6720.



No. 12900.

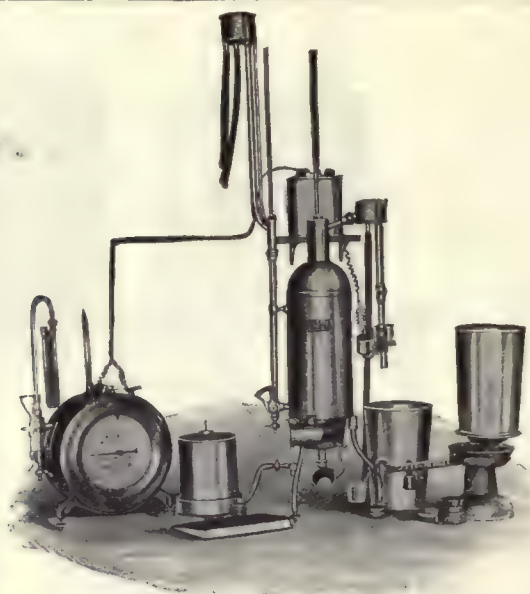
6696. **GAS APPARATUS, Hinman-Jenkins', for Sulphur**, complete with condensing tube filled with glass beads, adapters, overflow tube, watch glass, connectors and burner fitted with special lava tip, but without Erlenmeyer flask. (See Technologic Paper No. 20 of the United States Bureau of Standards)..... \$18.50
6698. **GAS APPARATUS, Referees', for Sulphur**, complete as illustrated with burner and support, without flask 20.00
6704. **GAS APPARATUS, Ruedorff's**, for determining carbon dioxide in illuminating and other gases. Complete with bottle, rubber stoppers, and ground in glass tubes, with three stop-cocks 9.00
- GAS APPARATUS, Wolpert's**, for carbon dioxide in air, see No. 146.
6720. **GAS BAGS, Rubber**, oval form, without stopcock.
- | | | | | |
|-------------------------|------|------|------|------|
| Capacity, gallons | 1 | 2 | 3 | 5 |
| Each | 3.00 | 3.25 | 3.80 | 5.00 |
12900. **STOPCOCK, Brass**, for No. 6720 Gas Bags. One end for attaching rubber tubing, the other a $\frac{5}{8}$ x2 $\frac{1}{2}$ -inch brass tube for nozzle of gas bag90
6722. **GAS BAGS, Rubber**, same as No. 6720, but with brass stopcock.
- | | | | | |
|-------------------------|------|------|------|------|
| Capacity, gallons | 1 | 2 | 3 | 5 |
| Each | 4.00 | 4.25 | 5.25 | 6.25 |
- GAS BALLOONS**, see Balloons, Glass.
6730. **GAS BURETTE, Bunte's**, with two stop-cocks, without water jacket. Graduated from -10 to 50 cc in $\frac{1}{10}$ th, and from 50 to 100 cc in 1 cc divisions..... 8.00
6732. **GAS BURETTE, Bunte's**, same as No. 6730, but with water jacket fitted with rubber stoppers 10.00
6736. **GAS BURETTE, Hempel's**, without stop-cocks, set in heavy metal bases, with one plain burette, and one burette graduated to 100 cc in $\frac{1}{2}$ cc divisions..... 9.30
6737. **GRADUATED BURETTE** only of No. 6736..... 3.50
6740. **GAS BURETTE, Hempel-Winkler**, same as No. 6736, but with graduated burette provided with two stop-cocks..... 15.00
6741. **GRADUATED BURETTE** only of No. 6740 with stop-cocks..... 9.00



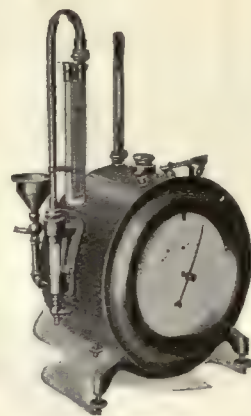
6744. **GAS BURETTE**, Hempel's, with compensating tube to correct for variations in temperature and pressure. Complete with stop-cock and leveling bulb, mounted on weighted metal bases, as illustrated \$20.00
6745. **GRADUATED BURETTE** only of No. 6744, with three-way stop-cock..... 7.00
6746. **LEVELING BULB** for No. 6744, mounted on heavy base..... 3.50
6747. **GLASS BULB** only of No. 6746..... 1.00
6750. **GAS BURETTE**, Hempel-Tutweiler, with four-way stop-cock, compensating tube, manometer, water jacket, and leveling bulb, mounted on heavy metal bases..... 22.00
6751. **GRADUATED BURETTE** only of No. 6750, with special four-way stop-cock..... 10.00
6754. **GAS BURETTE**, Hempel's, modified by the Illinois Steel Company, with burette graduated to 100 cc in $\frac{1}{10}$ cc divisions, three-way stop-cock, and water jacket, without support..... 8.00
6755. **GRADUATED BURETTE** only of No. 6754, with special three-way stop-cock..... 6.00

GAS CALORIMETERS AND ACCESSORIES

3770. **GAS CALORIMETER**, Parr's. This calorimeter measures the calorific value of any gas by burning under identical conditions the unknown gas along with a standard gas of known composition, so that equal volumes of both under equal pressures and temperatures impart their heat to equal volumes of water. The heat values, therefore, are in direct proportion to the readings of the two thermometers. Thus all metering of the gas is avoided, it being necessary only to maintain exact equivalents or multiples by means of the calibrated gas holders. Complete as illustrated, with automatic generator for standard gas (pure hydrogen), electric motor for driving the stirring apparatus, two angle thermometers with reading lenses, pilot lamp, gravity tank, one 2-pound can of Hydrone and instruction book. (See Journal of Industrial and Engineering Chemistry, Vol. II, No. 8, for August 1910, page 337)..... 325.00
6771. **EXTRA THERMOMETERS**, angle form, for No. 6770.....each 12.00
6914. **HYDRONE** for No. 6770, in 2-pound cans.....each 2.50



Nos. 6780-8.



No. 6786.

6780. **GAS CALORIMETER**, Sargent's Automatic, for testing the thermal value of inflammable gases.

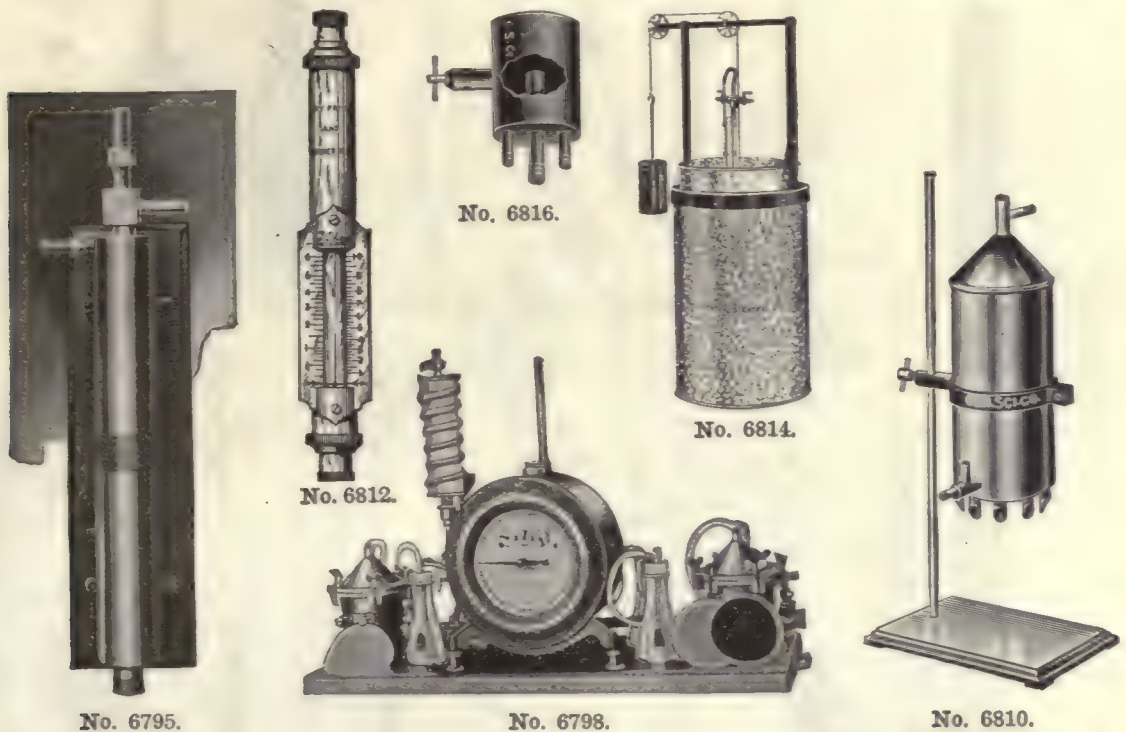
Distinctive Features.

- (1) The discharge water is weighed to one-hundredth of a pound instead of being measured in a graduate.
- (2) The discharge water is switched automatically from one receptacle to another after each one-tenth of a cubic foot of gas is burned. This eliminates errors due to hand manipulation.
- (3) Inlet and outlet thermometers are on the same level so that they can be read almost simultaneously.
- (4) A wet pressure governor controls the pressure of the gas entering the burner, and a constant pressure is easily maintained by means of adjustable weights.
- (5) To maintain a constant flow the inlet and outlet pipes are provided with weirs. A graduated quadrant valve regulates the amount of water used.
- (6) Since a determination can be made every three or four minutes, a curve of the heat value extending over any length of time may be plotted.
- (7) The heat value of the gas is determined directly in B.T.U.
- (8) The Bunsen burner has two tips and is adjustable for gas having 100 to 1500 B.T.U. per cubic foot.
- (9) The calorimeter is made of copper and brass and is handsomely nickel-plated.
- (10) The wet test gas meter is made of heavy brass and tin and has a water level indicator outside of the gage glass. The meter is graduated to 0.001 cubic feet.

Complete as described above, with calorimeter body, wet pressure governor, wet test gas meter, special scales, pair of weighing pails, and two No. 13537A Thermometers..... 300.00

Parts and Accessories for No. 6780.

6781.	CALORIMETER BODY , with automatic attachment, Bunsen burner, tubing, exhaust thermometer and beaker.....	135.00
13536A.	THERMOMETER , Precision, graduated from 60° to 110°F. in one-tenth degree divisions, for inlet and outlet temperatures, with calibration curve	18.00
13537A.	THERMOMETER , Precision, same as No. 13536A, but with Bureau of Standards certificate	25.00
13540.	THERMOMETER , High Grade, graduated from 30° to 150°F. in one-tenth degree divisions, for inlet and outlet temperatures. Suitable for all ordinary work.....	8.50
6785.	WET PRESSURE GOVERNOR , with weights	17.00
6786.	WET TEST GAS METER , with all attachments	65.00
6787.	SCALES , Special, weighing to hundredths of a pound. Capacity, 10 pounds.....	16.50
6788.	WEIGHING PAILS , nickel-plated, accurately balanced.....	per pair 6.00
6789.	SHIPPING CHEST , specially fitted for holding a complete calorimeter outfit in separate compartments	55.00
6790.	TABLES OF STANDARD REDUCTION FACTORS FOR GAS , in book form.....	1.50
6791.	HEAT VALUE COMPUTER , U. G. I.....	3.50
13730.	READING LENS for thermometer.....	3.00
6793.	MANOMETER , reading to 0.01 inch.....	18.00
6794.	MANOMETER for differential readings.....	20.00



6795. **GAS EJECTOR** for raising pressure of gas in suction producer to force it through meter and burner.

No.	A	B	C
Capacity, cu. ft. per min.....	0.1	0.2	0.5
Each	\$15.00	18.00	25.00

6798. **DUST, TAR AND MOISTURE DETERMINATOR** for illuminating gas, complete with meter, two dust filters and calcium chloride flasks 160.00

6799. **DUST FILTER WELL** only of No. 6798, without meter 45.00

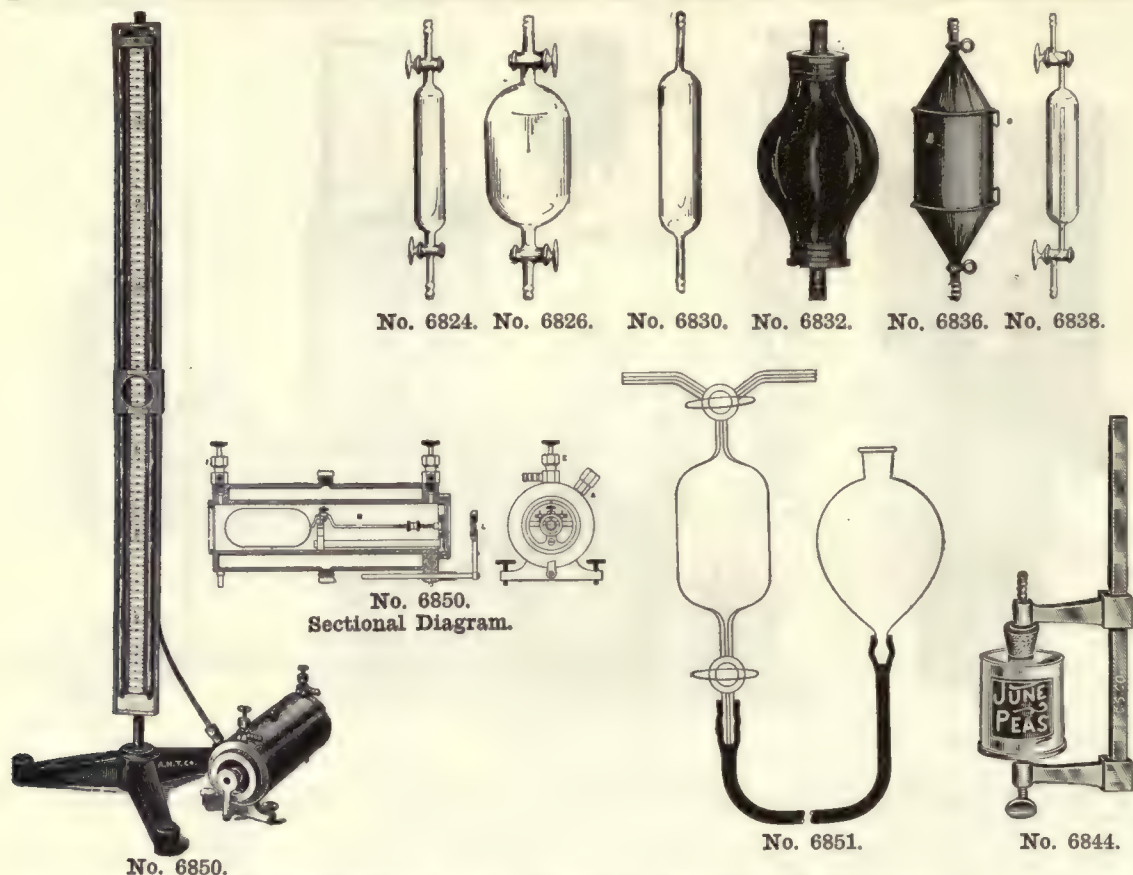
6810. **CALORIMETER, Junkers, Mann's modification**, for determining the approximate heating value of gas. Consists of a double walled copper vessel provided with a number of tubes or flues so arranged as to receive the heat from a Bunsen flame. These tubes coming in contact with water which is running continuously through the Calorimeter give up their heat. A thermometer placed in the orifice at the top registers the temperature of water at delivery, a second thermometer placed in orifice at the bottom registers the temperature at entrance. Any convenient gas measuring apparatus will give the amount of gas supplied the burner. (See No. 6812 Thorp Gage, or No. 6814 Gas Meter.) A vessel placed to catch water delivered gives amount of water passing through the Calorimeter. Complete with support, but without gas meter or thermometers 10.00

6812. **THORP GAGE**, a convenient means of measuring approximately both the pressure and the rate of flow of gas. When the gas supply is attached to the inlet and the cap is screwed down over the outlet at top, the index reads on left hand scale the pressure in inches of water. When testing the consumption of a burner, the pressure cap is unscrewed and the burner screwed in its place. The indicator then registers on the right hand scale the number of cubic feet of gas consumed per hour 16.00

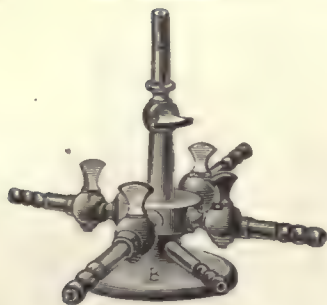
6814. **GAS METER, Constant Pressure**, for use with No. 6810, consisting of a galvanized iron tank in which a gas tank having a capacity of about 2 cubic feet is floated. Only a small amount of oil or water is required. The gas tank is kept in an upright position by two vertical guides, one of which is provided with a scale so graduated that readings of the contents of the tank may be made to within 0.01 cubic foot. The tank is provided with inlet and outlet stop-cocks of brass and with a manometer graduated in millimeters for indicating the gas pressure, which may be varied by means of weights placed on the tank. A counterpoise is provided both for filling the tank and for adjusting the pressure on the gas. Complete as described with weights of 1, 2 and 5 kilos and a weight hanger weighing 1 kilo..... 50.00

6816. **CONSTANT LEVEL WATER TANK or Weir**, for use with No. 6810 Calorimeter or any other device in which the flow of water at a uniform pressure is important. Consists of a metal tank of about 350 cc capacity, provided with inlet and outlet tubes properly arranged. and with a clamp for attaching to an upright support rod of 1/2-inch diameter..... 4.00

GAS COCKS, see **Stop-Cocks**.



- No. 6850.**
6824. **GAS COLLECTING TUBES**, of glass, long form, with two glass stop-cocks.
- | | | | |
|-------------------|--------|------|------|
| Capacity, cc..... | 125 | 250 | 500 |
| Each | \$4.30 | 4.50 | 4.80 |
6826. **GAS COLLECTING TUBE**, short form, of glass with two stop-cocks. Capacity, 125 cc.. 4.30
6830. **GAS COLLECTING TUBE**, Illinois Steel Company's, of glass without stop-cocks. Capacity, about 250 cc..... 1.50
6832. **GAS COLLECTING TUBE**, Rubber, double acting, for use in filling tubes and bottles with sample to be tested..... .60
6836. **GAS COLLECTING TUBE**, Winkler's, of zinc with two brass stop-cocks. Length, 12 inches; diameter, $4\frac{1}{2}$ inches..... 4.50
6838. **GAS COLLECTING TUBES**, United States Bureau of Mines Form, of glass, with two stop-cocks. Capacity, 125 cc. (See Bulletin 97, United States Bureau of Mines, page 53) 6.00
6844. **GAS COLLECTOR**, Doremus, for collecting gases from canned goods for analysis. Consists of an adjustable clamp with hollow needle and thumb-screw. A rubber gasket prevents the escape of gas around the needle..... 4.00
6850. **GAS DENSITY BALANCE**, Edwards, developed at the National Bureau of Standards for the rapid and accurate determination of the specific gravity of gas. In point of speed it is far superior to the method of direct weighing of the gas on an analytical balance, and gives an accuracy only obtainable by the latter method when carried out with elaborate precautions. The apparatus consists of a balance beam B carrying a sealed cylinder on one end and a counterweight on the other. The balance beam with its support is mounted in a gas-tight chamber to which is attached a mercury manometer. In operation, the balance case and manometer connections are filled with dry air through the inlet I and the pressure adjusted by removing the excess gas through the needle valve E until the beam just balances, as determined by observation through the adjustable lens L of the cross line on the end of the beam. After determining this pressure, the balance is evacuated through E and filled with the gas; the pressure is then adjusted until the beam is again in equilibrium. The specific gravity of the gas is then the ratio of the total pressure (manometer reading plus atmospheric pressure) required to balance the beam in air to the total pressure required to balance it in the gas. Complete as described with manometer and mercury for charging, in carrying case with directions for use. (See Technologic Paper No. 89 of the United States Bureau of Standards) 100.00
6851. **LEVELING BOTTLE** for No. 6850, with stop-cocks and reservoir but without rubber tubing 9.00
- For **PUMPS** for use with No. 6850, see general heading **Pumps**.



No. 6860.



No. 6896.



No. 6866.



No. 6872.



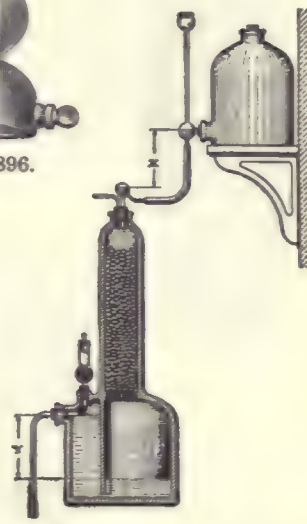
No. 6874.



No. 6882.



No. 6884.



No. 6886.

6858. **GAS DISTRIBUTOR**, with three side tubes with stop-cocks, and no center burner..... \$5.50

6860. **GAS DISTRIBUTOR**, with four side tubes and center burner, all with stop-cocks..... 7.70

GAS DRYING APPARATUS, see **Drying Apparatus**.

6866. **GAS FILTER**, of glass, for determining dust in furnace and other gases, with ground in connecting tube and projections to support extraction thimble. Length of enlarged portion, 2½ inches; diameter at top, 2¼ inches; diameter of connecting tube at top, 1 inch. Without thimble..... 3.50

GAS GENERATING MACHINE, see **Gas Machines No. 6936**.

6872. **GAS GENERATING BOTTLES**, without fittings.

Capacity, pints	½	1	2	4
Each .....	.17	.22	.30	.45

6874. **GAS GENERATING BOTTLES**, same as No. 6872, but fitted with rubber stopper, funnel tube and delivery tube. Capacity, pints

Capacity, pints	½	1	2	4
Each .....	.50	.55	.67	.90

6882. **GAS GENERATOR, Dropping, Freas**, an effective, cleanly, economical method of obtaining any gas desired for use. Without flask..... 5.00

6884. **GAS GENERATOR, Hind's**, for hydrogen sulphide and other gases; intended for individual use. Complete with stop-cock funnel tube, stop-cock delivery tube and rubber stopper. (See Journal of American Chemical Society, Vol. XXXIII, page 384)..... 5.00

6886. **GAS GENERATOR, Improved Automatic**, of stoneware. A simple and efficient generator for the production of hydrogen sulphide, carbon dioxide, hydrogen and other gases in considerable quantity for industrial and college laboratories. In use, the long upright column is filled nearly full of the necessary solid reagent and the lower reservoir with water. The fittings are then put in place and the upper reservoir filled with the liquid reagent. Normal pressure is soon generated, and as soon as the tension Y is obtained in the lower reservoir, acid is automatically delivered to the top of the column as required and the generator is ready for continuous operation with very little further attention. The upper reservoir and the lower reservoir and column are of acid-proof chemical stoneware and all necessary glass parts and rubber stoppers are furnished..... 25.50

6887. **LOWER RESERVOIR and Column** only of No. 6886..... 16.50

6888. **UPPER RESERVOIR** only of No. 6886..... 4.50

6889. **GLASS DISTRIBUTOR** of No. 6886..... 1.25

6896. **GAS GENERATORS, Kipp's Apparatus**, of glass, complete with safety funnel tube, stopcock, ground-in glass stopper, and rubber stoppers. Capacity, cc.....

Capacity, cc.....	500	1000	2000
Each	\$9.00	11.00	15.00

6898. **STOPCOCK** only of No. 6896..... 1.75

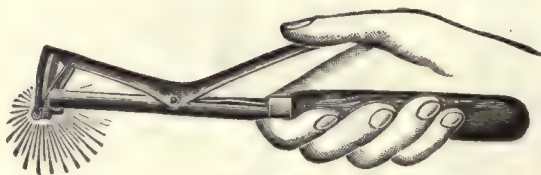
6899. **FUNNEL TUBE** only of No. 6896..... .40



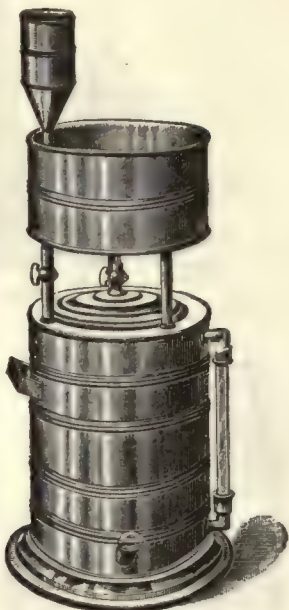
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No. 6910.

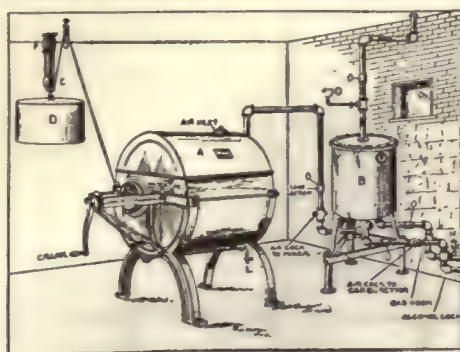


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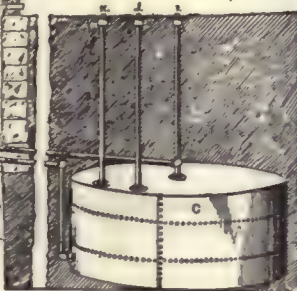


Nos. 6916-18.

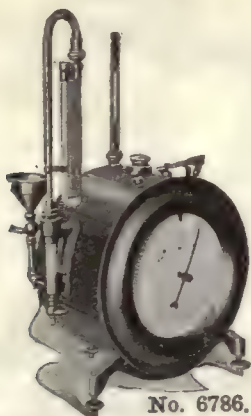
6908. **GAS GENERATOR** for Oxygen, of metal, 9½ inches high; weight, 2½ pounds. Generates a steady supply of pure oxygen from Oxone or peroxide of sodium in cartridge form. The cartridges come in hermetically sealed tin cans, which, when placed in the generator, are punctured. Each cartridge will furnish about 14 or 15 gallons of oxygen, which, if passed through a wash bottle containing water, will be 100 per cent. pure. As it comes from the generator it is 99.3 per cent. pure..... \$17.50
6909. **CARTRIDGES** for No. 6908.
- | | |
|--------------------|------|
| Each | .60 |
| Per box of 20..... | 5.00 |
6910. **GAS GENERATOR**, Oxygen, "Autogenor," high pressure, for producing a supply of pure oxygen from oxone at pressures up to 50 pounds. Complete as illustrated..... 27.00
6911. **OXONE**, for No. 6910 in round cakes weighing 6½ to 7 ounces and yielding 1 cubic foot each; in tins of 6 cakes..... per tin 1.25
6912. **GAS GENERATOR**, Hydrogen, "Autogenor," same as No. 6910, but with special arrangement for generating pure hydrogen from Hydrone 28.00
6913. **EXTRA HOLDER** for No. 6912, for use with Oxone. By the purchase of this extra holder, the same generator may be used for both hydrogen and oxygen..... 1.00
6914. **HYDRONE** for No. 6912, in tins holding 2 pounds and yielding 26 cubic feet per pound.
- | | |
|--------------|------|
| Per tin..... | 2.50 |
|--------------|------|
- GAS GENERATOR**, Retort, for oxygen, see **Retorts**, Copper, No. 11462.
6916. **GAS HOLDERS (Gasometer)**, Pepys-Berzelius, improved form, made of heavy zinc, with brass fittings and water gage.
- | | | |
|-------------------------|-------|-------|
| Capacity, gallons | 5 | 10 |
| Each | 25.00 | 30.00 |
6918. **GAS HOLDERS (Gasometer)**, Pepys-Berzelius, same as No. 6916, but of heavy copper.
- | | | |
|-------------------------|-------|-------|
| Capacity, gallons | 5 | 10 |
| Each | 30.00 | 37.50 |
- For **CONSTANT PRESSURE GAS HOLDER**, see No. 6814.
6924. **GAS LIGHTER**, improved, producing by friction a flash of hot sparks, which will light any kind of gas or inflammable vapors..... .50
6925. **SPARK METAL RENEWAL** for No. 6924..... .25



No. 6936.



No. 6944. No. 6946. No. 6948.



No. 6786.



No. 6956.

6936. **GAS MACHINES**, Matthews, for the automatic production of gas for laboratory use, where a source of natural or illuminating gas is not available. The machine consists essentially of a carburetor to contain the gasoline and supply the gas, an air pump or blower to furnish the air, an automatic mixer for producing the proper mixture, a weight which furnishes the motive power for the air pump, and the necessary connections. The entire process is automatic, it being necessary only to wind the weight up once a day, and to fill the carburetor once or twice a year with gasoline. There is no danger in connection with this machine and no extra insurance required as it has been passed by the National Board of Underwriters. Complete as described with air pump, carburetor, mixer, pulleys, wire rope, weight holder and all necessary connections, but not including gas pipe.

No.	A	B	C	D	E	F	G	H
Number of burners.....	30	40	50	75	100	150	200	300
Capacity of carburetor, gals.	156	202½	252	315	375	437	512	770
Number of cells.....	2	2	3	3	4	4	4	4
Shipping weight, complete, including mixer, lbs.....	1150	1475	1600	2125	2525	2750	3000	3900
Each	\$243.00	290.00	326.00	374.00	458.00	556.00	653.00	845.00

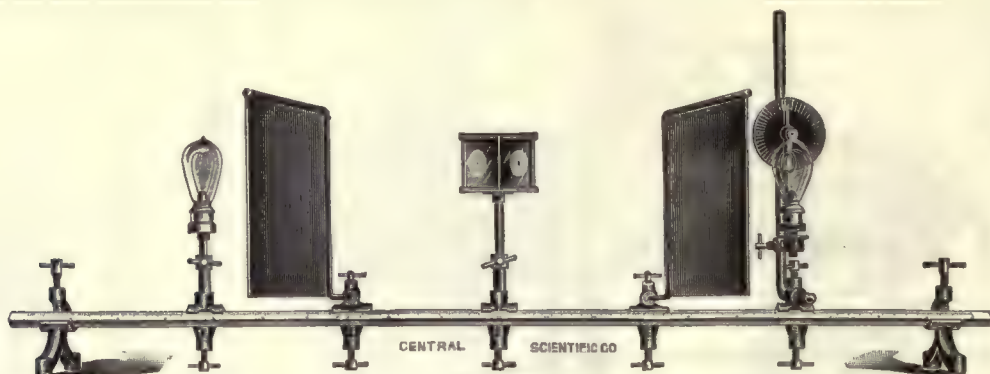
6944. **GAS MEASURING TUBES**, of glass, graduated, without stopcock. No... A B C
Capacity, cc..... 25 50 100
Graduated in, cc..... ¼ ½ 1
Each

6946. **GAS MEASURING TUBES**, same as No. 6944, but with glass stop-cock.
No. A B C
Capacity, cc..... 25 50 100
Graduated in, cc..... ¼ ½ 1
Each

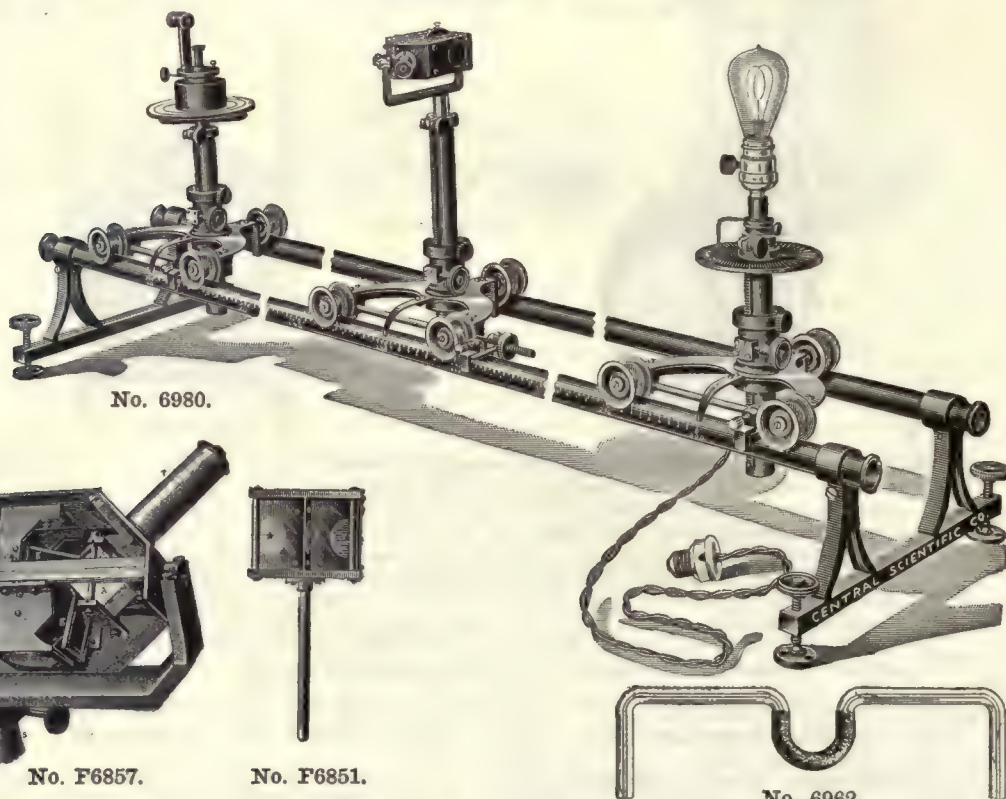
6948. **GAS MEASURING TUBE**, Kahlenberg's, with stop-cock and funnel top; graduated to 50 cc in ¼ cc divisions..... 3.00

6786. **GAS METER**, Wet Test Type, with dial graduated to ¼ cubic foot in ¼,000ths. Recording train will integrate 100 cubic feet before repeating. Provided with two spirit levels, leveling screws, filling funnel, outlet stop-cock, drain plug, gage glass, manometer, thermometer, and electric switch. Specially adapted for calorimeter work 65.00

6956. **GAS METER**, for Photometric Work, with ¼,12th cubic foot drum, and hourly rate dial reading from 0 to 5 cubic feet per hour. At the legal rate for candle power determination, 5 cubic feet per hour, the large pointer makes one revolution per minute. Maximum capacity per hour with ¾,10 inch differential pressure, 18 cubic feet. Complete with water gage, thermometer, two spirit levels and leveling screws; finished in dead black..... 75.00



No. 6970.



No. 6980.

No. F6857.

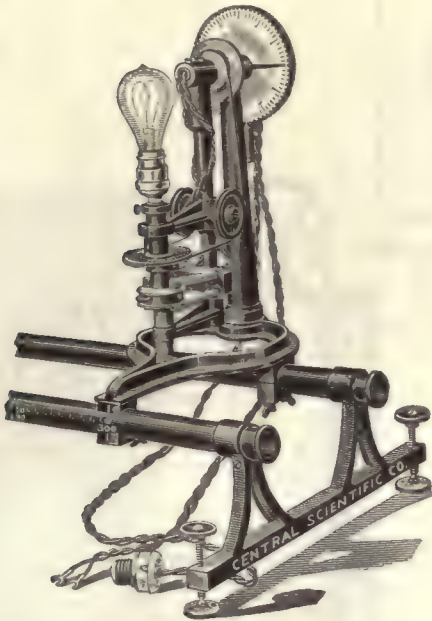
No. F6851.

No. 6962.

6962. **GAS PALLADIUM TUBE**, Hempel's, for hydrogen determinations, containing about $2\frac{1}{2}$ grams of palladium sponge..... \$7.50
6970. **GAS PHOTOMETER**, simple form, for determining candle power of illuminating gas. Consists of nicked steel rod, graduated from 0 to 200 cm in 1 mm divisions; end supports for graduated rod; two eye shades or screens with supports; Bunsen-Dibdin photometer box with clamp for supporting same; gas burner mounted on adjustable support with six-foot tip; and standard incandescent lamp, 16 candle power, 110 volts 35.00

Parts and Accessories for No. 6970.

- F6851. **PHOTOMETER BOX**, Bunsen, Dibdin's Modification. In the Bunsen box the grease spot and its surrounding media do not transmit light equally, and in consequence the grease spot is never entirely lost, even when equal illumination is on either side. We have therefore modified the Bunsen form, according to Dibdin, and use a star of paper through which light may pass. Mounted on rod to fit No. F180 Clamp 3.50
- F6857. **PHOTOMETER BOX**, Lummer-Brodhun, contrast type, with which lights of different color values may be compared more accurately than with the disappearing type. Mounted on rod to fit No. F180 Clamp 60.00
- F6801. **CANDLE HOLDER**, for one candle, mounted on rod to fit No. F179A Clamp..... .55
- F6803. **CANDLE HOLDER**, for four candles, mounted on rod to fit No. F179A Clamp..... 1.00
- F6817. **LAMP SOCKET**, Edison, for holding incandescent lamps, mounted on rod to fit No. F179A Clamp 1.25



No. F6933.

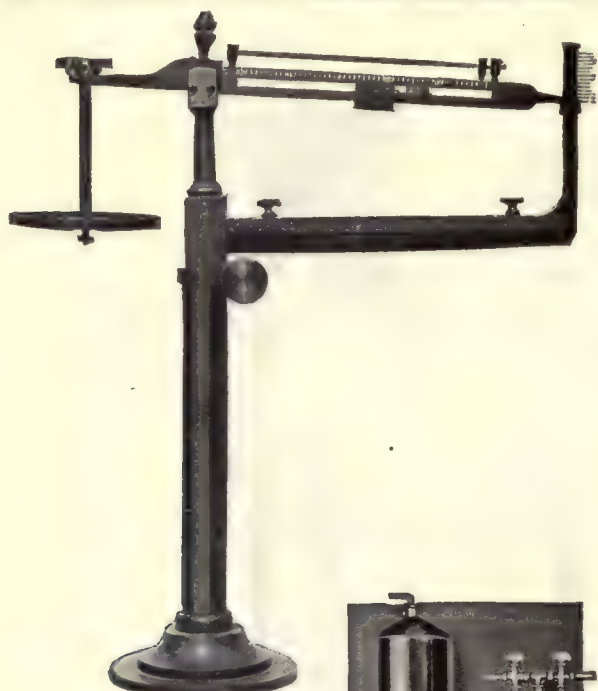


No. F6831.

6980. **GAS PHOTOMETER, Precision Form**, designed for exact photometric work and arranged so that it may be used with a large number of accessories, adapting it for a variety of uses. The bed consists of two large brass parallel tracks, carried on supports fitted with brass leveling screws with sockets for permanent attachment to bench. The carriages are substantially made with rack and pinion for vertical adjustment with clamping collar to prevent slipping. A pointer extending down to the track indicates the exact location of the center. Clamps are furnished to hold the carriages at any desired point. The observing carriage is provided with a slow motion screw for careful horizontal adjustment. The carriages are constructed to take accessories with a 19 mm rod. Length of graduated portion of track, 300 cm, graduated in 1 mm divisions. Complete as described with two end carriages, observing carriage, platform for standard lamp, and Lummer-Brodhun photometer box with collar to fit observing carriage; without standard lamp or gas burner. (For illustration see preceding page.)..... \$391.00

Parts and Accessories for No. 6980.

- | | |
|---|--------|
| F6923. BED , 3 meters between lights, graduated in millimeters | 90.00 |
| F6924. END CARRIAGE , for Standard or Unknown illuminant | 50.00 |
| F6925. OBSERVING CARRIAGE , for comparison screen | 60.00 |
| F6926. SOCKET , with cord and plug, for incandescent lamp, with 19 mm rod..... | 3.50 |
| F6927. PLATFORM , for standard lamp, with 19 mm rod | 6.00 |
| F6928. GRADUATED DISC , to be used on end carriage with incandescent lamp to secure mean horizontal power of lamp..... | 10.00 |
| F6931. COLLAR , for use on Nos. F6924-5 when it is desired to use an accessory having a rod 10 mm in diameter | 2.00 |
| F6933. UNIVERSAL COMPOUND ROTATOR , for obtaining mean spherical candle power of an incandescent lamp. It consists of a heavy frame that can be clamped to the photometer track. The lamp socket is attached to a shaft mounted on ball bearings. This shaft may be adjusted in a vertical plane by angles of 5°. It is held to the desired angle by a pin fitting into a slot in the periphery of an accurately graduated disc. The horizontal position of the lamp is read on another graduated circle. The rotator is provided with two sets of brushes, one for delivering the lighting current to the lamp, the other for leads to the electrical measuring instruments. The rotator is also provided with all necessary pulleys and belt and may be driven by any 1/12 H. P. motor | 125.00 |
| F6805. GAS BURNER , with 6-foot tip, mounted on rod to fit No. F179A Clamp..... | 1.00 |
| F6807. GAS BURNER, Welsbach , complete, mounted on rod to fit No. F179A Clamp..... | 2.50 |
| For COLLAR for use with Nos. F6805-7, see No. F6931. | |
| F6831. LAMP, Harcourt Pentane , adopted as standard by the Metropolitan Gas Referees of London and used widely in this country. Recommended by the United States Bureau of Standards as the flame standard for photometric work. Manufacturer's rating, 9.98 candles. Mounted on adjustable support, with directions for use | 110.00 |



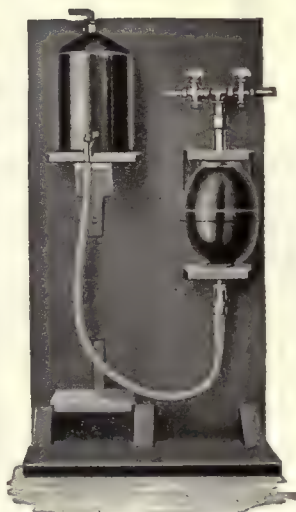
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No. 6993.



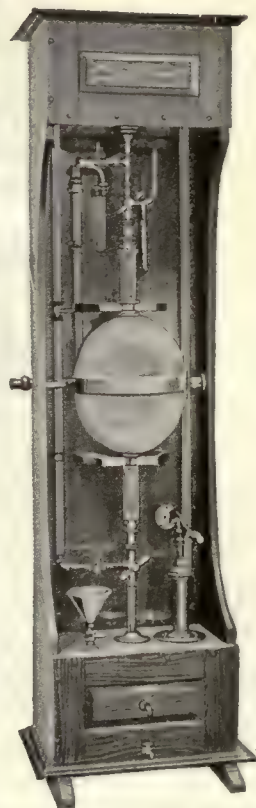
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No. 7004.

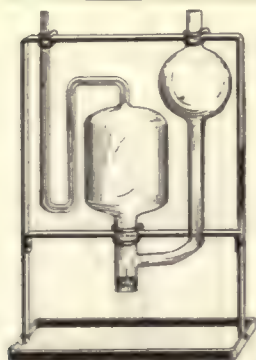


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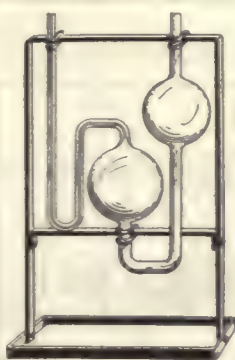


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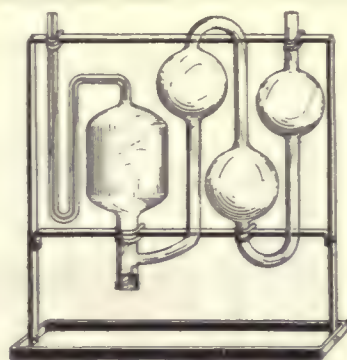
6993. **BURNER**, Carpenter's Metropolitan Argand No. 2, specified as the official test burner for coal gas by the Metropolitan Gas Referees of London \$25.00
6995. **EDGERTON STANDARD SCREEN**, to be mounted on an Argand burner. Used widely in gas works as a standard for candle power in photometric work where frequent approximate tests are to be made. Must be standardized against standard candle..... 2.25
- F6665. **CANDLES**, Standard, sperm, six to the pound, will burn 120 grains (7.776 grams) of wax per hour Each .35
6997. **CANDLE BALANCE**, for determining rate per hour at which standard candles burn, complete with set of three twenty-grain weights..... 75.00
- WET PRESSURE GOVERNOR**, for delivering gas at uniform pressure see No. 6785.
For **STOP WATCH**, for use in gas testing, see Nos. 12954 to 12962.
7000. **CUBIC FOOT BOTTLE**, Immersion Form, used in standardizing meters in gas testing. Delivers exactly one cubic foot of gas by displacement with water. Made of polished brass. With certificate of the United States Bureau of Standards..... 185.00
7002. **CUBIC FOOT BOTTLE**, Cabinet Form, of lacquered copper with nicked brass fittings. Operates by gravity displacement of gas by water. With certificate of the United States Bureau of Standards..... 400.00
7004. **CUBIC FOOT BOTTLE**, capacity $\frac{1}{10}$ cubic foot, made of polished copper with reservoir of same. Mounted on portable wooden stand with adjustable shelves. With certificate of the United States Bureau of Standards..... 80.00
7006. **CUBIC FOOT BOTTLE**, same as No. 7004, but with a capacity of $\frac{1}{12}$ cubic foot, with certificate of the United States Bureau of Standards..... 80.00



No. 7020.



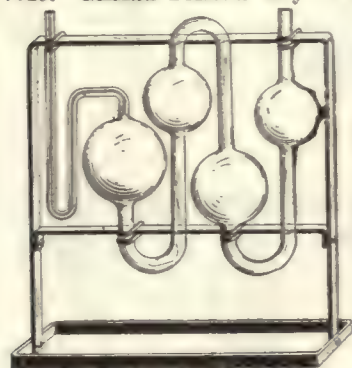
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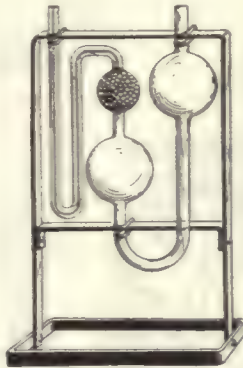
No. 7028.

GAS PIPETTES

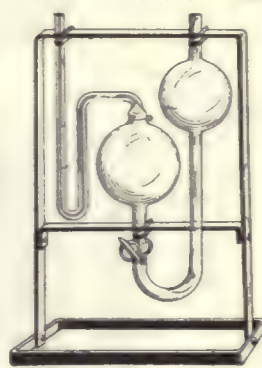
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|-------|---|---------------|
| 7020. | GAS PIPETTE , Hempel's Simple Absorption, for solid or liquid reagents, mounted on japanned iron support with adjustable clamps..... | \$4.25 |
| 7021. | GLASS PARTS only of No. 7020..... | 2.30 |
| 7024. | GAS PIPETTE , Hempel's Simple Absorption, for liquid reagents only, mounted on iron support | 3.90 |
| 7025. | GLASS PARTS only of No. 7024..... | 2.00 |
| 7028. | GAS PIPETTE , Hempel's Double Absorption, for solid and liquid reagents, mounted on iron support | 5.00 |
| 7029. | GLASS PARTS only of No. 7028..... | 3.00 |



No. 7032.

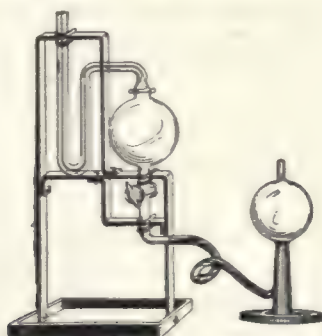


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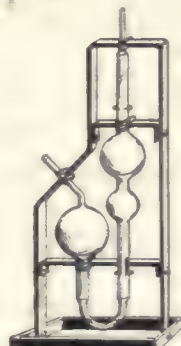


No. 7040.

- | | | |
|-------|--|-------------|
| 7032. | GAS PIPETTE , Hempel's Double Absorption, for liquid reagents only, mounted on iron support | 5.00 |
| 7033. | GLASS PARTS only of No. 7032..... | 3.00 |
| 7036. | GAS PIPETTE , Hempel's Simple Absorption for Ethylene, with glass beads, mounted on iron support | 5.25 |
| 7037. | GLASS PARTS only of No. 7036..... | 3.30 |
| 7040. | GAS PIPETTE , Hempel's Simple Explosion, with glass stop-cock and platinum electrodes, mounted on iron support..... | 9.00 |
| 7041. | GLASS PARTS only of No. 7040..... | 6.00 |

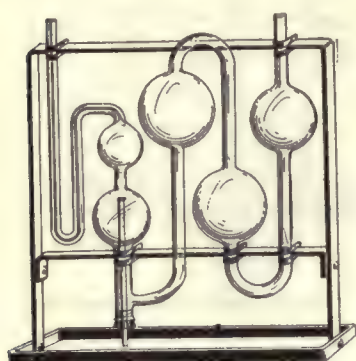


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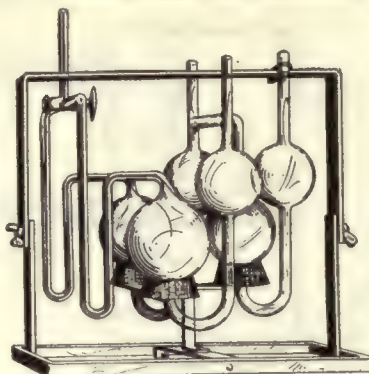


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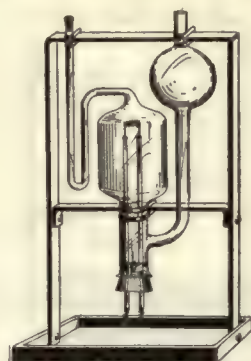
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|-------|---|--------------|
| 7044. | GAS PIPETTE , Hempel's Explosion, with stop-cock, platinum electrodes, separate leveling bulb and connecting tube, mounted on iron support | 9.50 |
| 7045. | GLASS PARTS only of No. 7044..... | 6.00 |
| 7048. | GAS PIPETTE , Hempel's Explosion, tall form with electrodes for producing oxygen and hydrogen, mounted on iron support..... | 10.00 |
| 7049. | GLASS PARTS only of No. 7048..... | 7.50 |



No. 7052.



No. 7056.



No. 7060.

7052. **GAS PIPETTE**, Hempel's Double, for the Preparation of Pure Hydrogen, mounted on iron support \$9.50
7053. **GLASS PARTS** only of No. 7052..... 7.50
7056. **GAS PIPETTE**, United Gas Improvement Co.'s Form, double, for cuprous chloride, mounted on iron support..... 15.00
7057. **GLASS PARTS** only of No. 7056..... 10.00
7060. **GAS PIPETTE**, Winkler's, for the determination of methane, with removable platinum spiral, mounted on a metal support with adjustable clamps..... 9.50
7061. **GLASS PARTS** only of No. 7060..... 6.50
7062. **PLATINUM SPIRAL** only of No. 7060, mounted in a double glass tube..... 1.75



No. 7096.



No. 7076.



No. 7090.



No. 7094.



No. 7098.



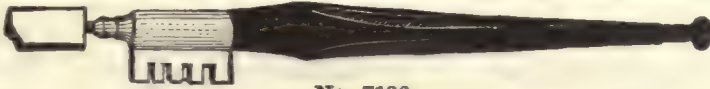
No. 7102.

GAS PLIERS, see Pliers.

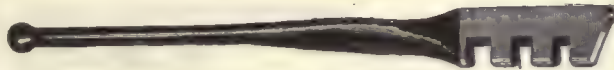
7070. **GAS PRESSURE REGULATOR**, Murrill's, for delivering gas to a burner at constant pressure. Widely used with gas thermostatic regulators (See Nos. 13762 to 13786)..... 10.00
- GAS PRESSURE REGULATOR** for oxygen tanks, see No. 6556.
- GAS REGULATORS**, thermostatic, see Thermo-Regulators.
7076. **GAS TIME REGULATOR**, for shutting off supply of gas at any desired time. Consists of a valve controlled by a lever, mounted on a specially constructed clock. Regulator is placed in the line between gas burner and supply tap. With $\frac{1}{8}$ th inch passage through valve.. 5.50
7080. **GAS TIPS**, Aluminum, 6 foot..... Per dozen .60

GAS WASHING BOTTLES

7090. **GAS WASHING BOTTLES**, Allihn's, double action, with ground in stoppers.
- | | | |
|-------------------|------|------|
| Capacity, cc..... | 250 | 500 |
| Each | 2.50 | 3.00 |
7094. **GAS WASHING BOTTLES**, Drechsel's high form, with tubes ground into neck.
- | | | | |
|-------------------|------|------|------|
| Capacity, cc..... | 125 | 250 | 500 |
| Each | 1.30 | 1.50 | 2.00 |
7096. **GAS WASHING BOTTLES**, Drechsel's low form, with tubes ground into neck.
- | | | | |
|-------------------|------|------|------|
| Capacity, cc..... | 125 | 250 | 500 |
| Each | 1.35 | 1.55 | 2.20 |
7098. **GAS WASHING BOTTLES**, Muencke's, wide mouth, with ground in tubes. Capacity, 250 cc
- | | |
|--------------|------|
| 250 cc | 2.50 |
|--------------|------|
7102. **GAS WASHING BOTTLES**, plain form, with rubber stopper and fittings.
- | | | | |
|-------------------|-----|-----|------|
| Capacity, cc..... | 250 | 500 | 1000 |
| Each | .40 | .50 | .65 |



No. 7136.



No. 7138.



No. 7140.



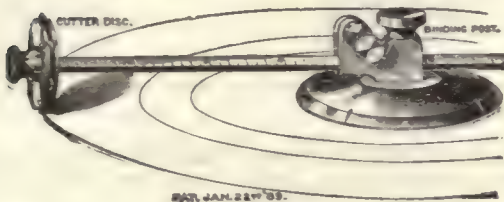
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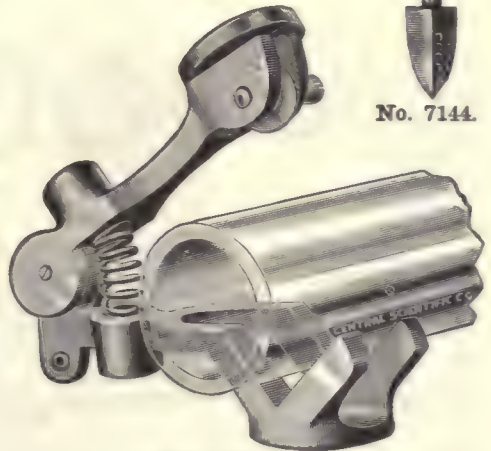
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No. 7148.



No. 7150.



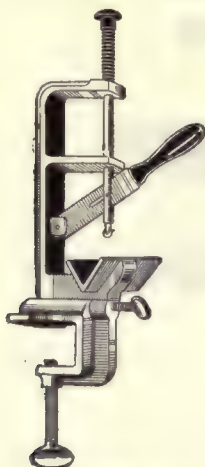
No. 7154.

GAUZE, WIRE, see Wire Gauze.

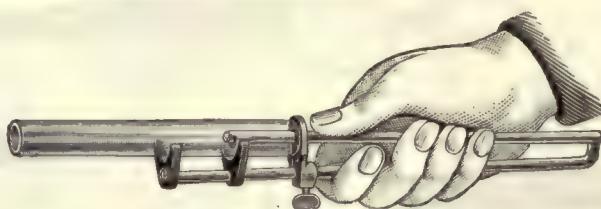
7120. GIMLETS, in sets of three sizes— $\frac{1}{8}$, $\frac{5}{32}$ and $\frac{3}{16}$ inch.....Per set of three \$0.20
 7128. GLASS BEADS, see Beads, Glass.
 7128. GLASS BEADS, with hole through center, from 4 to 6 mm in diameter.....Per pound 1.50

GLASS CUTTERS, ALL KINDS

7136. GLASS CUTTER, Glazier's Diamond, for cutting or writing on glass. Handle nicely finished; metal parts nickel-plated. Diamond can be reset several times. Cuts single-thick glass. 5.00
 7138. GLASS CUTTER, Steel Wheel, polished and bronze finish12
 7140. GLASS CUTTER, Steel Wheel, having six cutting wheels in a turret head which may be revolved on or clamped to the frame. The cutters are protected when not in position for use.... .40
 7141. EXTRA CUTTING WHEELS for No. 7140.....Per dozen .60
 7144. GLASS CUTTING TOOL, Parker's, designed to replace the hot file as an instrument for cutting glass by leading a crack in the desired direction. Consists of a heavy pointed copper head, attached to a gas supply tube with wooden handle, the whole constituting a burner. When the air and gas supply are regulated to cause the flame to strike back, the head becomes intensely hot and can be used to cut glass into almost any shape desired. (See Journal of American Chemical Society, Vol. XL, No. 1, January, 1918, page 195.)..... 1.50
 7146. GLASS DISK CUTTER. Will cut disks from 4 to 40 inches in diameter..... .70
 7148. GLASS DISK CUTTER. Will cut disks from 1 to 20 cm in diameter. The cutter arm is graduated in millimeters and provided with turret head having six cutting wheels as in No. 7140. The apparatus can also be used for cutting disks of cardboard, metal and other materials. (For Extra Cutting Wheels see No. 7141.)..... 9.00
 7150. GLASS DISK CUTTER, with cutting disk at end of 13 inch adjustable graduated arm, with six steel cutting wheels; mounted on heavy brass base faced with rubber on under side... 3.60
 7151. EXTRA CUTTING WHEEL DISK for No. 7150, with six wheels..... 1.20
 7154. GLASS TUBING CUTTER. The pressure on the cutting wheel may be regulated so as to be firm and even 1.10
 7155. EXTRA CUTTING WHEEL for No. 7154, or No. 7164. 1.0



No. 7164.



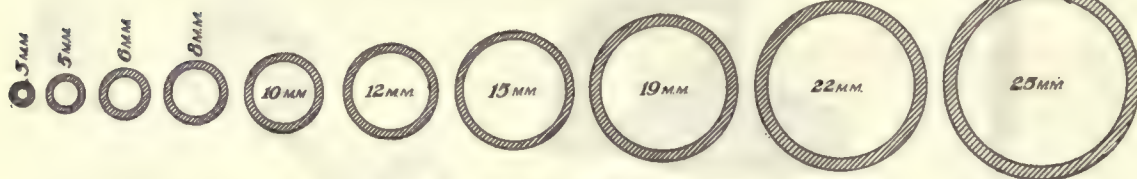
No. 7160.



No. 7168.



No. 7182.



No. 7190.

GLASS INK, see **Diamond Ink No. 3816**.

GLASS PLATES, see **Plates, Glass**.

7160. **GLASS TUBING CUTTER** for cutting tubing from inside. The glass tube is held in fiber rests so that the cutting wheel describes a perfect circle. Length 12 inches; cuts glass of from $\frac{3}{16}$ to 1 inch inside diameter up to 8 inches length. \$1.50
7161. **EXTRA CUTTING WHEEL** for No. 7160. .15
7164. **GLASS TUBING CUTTER**, to clamp on the table, with hardened steel cutting wheel and handle for producing even pressure. Will take tubing from $\frac{3}{16}$ to $1\frac{1}{2}$ inches. For extra cutting wheel see No. 7155. 6.50
7168. **GLASS TUBING CUTTER**, a highly tempered steel knife with wooden handle. Both sides can be used. 1.25
7180. **GLASS ROD**, best quality lead free glass, in lengths of about five feet. From 3 to 13 mm in diameter. Diameters are subject to usual factory variations. Rod in smaller quantities than 5 pounds if desired in full lengths should be so specified, otherwise lengths convenient for packing may be sent. An additional charge will be made for selecting rod gauged accurately.
- | | | | | | | | | |
|---------------|-----|-----|---|---|---|----|----|----|
| Diameter, mm. | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 13 |
| Per pound. | .60 | .50 | | | | | | |
- Please specify diameter in ordering.
7182. **GLASS RODS**, Stirring, with one end rounded, the other pointed. Size, in. $5 \times \frac{1}{8}$ $8 \times \frac{3}{16}$ $10 \times \frac{1}{4}$
- | | | | |
|------------|-----|-----|-----|
| Per dozen. | .35 | .50 | .60 |
|------------|-----|-----|-----|
7184. **GLASS ROD**, soft glass, for sealing in platinum. per pound .60
7190. **GLASS TUBING**, best soft glass, lead free, for glass blowing, bending, etc., in lengths of about five feet. Diameter and thickness of wall are subject to usual factory variations. An additional charge will be made for selecting tubing gauged accurately inside or outside. Tubing in smaller quantities than 5 pounds, if desired in full lengths, should be so specified, otherwise lengths convenient for packing may be sent. Orders for assorted tubing above 25 mm must be for 5 pounds or more; orders for assorted tubing from 13 to 25 mm must be for 2 pounds or more; from 3 to 12 mm for 1 lb. or more.
- | | | | | | | | | | | | | | | | |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Diam. outside, mm. | 3 | 5 | 6 | 8 | 10 | 12 | 15 | 19 | 22 | 25 | 32 | 35 | 38 | 47 | 50 |
| Per pound. | .80 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .50 | .60 | .60 | .80 | .80 | .80 |
7192. **GLASS TUBES**, Annealed Ends. Glass tubes of large diameter are not satisfactory unless ends are annealed to prevent longitudinal cracking. We list below a few sizes but can supply any size desired.
- | | | | | | | | | | | | | |
|-----------------------|------|------|------|-----|------|------|------|------|------|------|------|------|
| No. | A | B | C | D | E | F | G | H | J | K | L | M |
| Diameter outside, cm. | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 3 | 3 | 4 | 4 | 4 | 4 |
| Length, cm. | 30 | 60 | 75 | 100 | 120 | 150 | 100 | 120 | 45 | 60 | 90 | 100 |
| Each | .40 | .60 | .70 | .70 | .75 | .80 | 1.10 | 1.20 | .90 | 1.10 | 1.70 | 1.75 |
| No. | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| Diameter outside, cm. | 4 | 4 | 4.5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Length, cm. | 110 | 120 | 100 | 20 | 30 | 38 | 45 | 60 | 75 | 90 | 120 | 150 |
| Each | 1.80 | 1.85 | 2.50 | .70 | 1.10 | 1.20 | 1.25 | 1.30 | 1.60 | 1.70 | 2.60 | 2.80 |



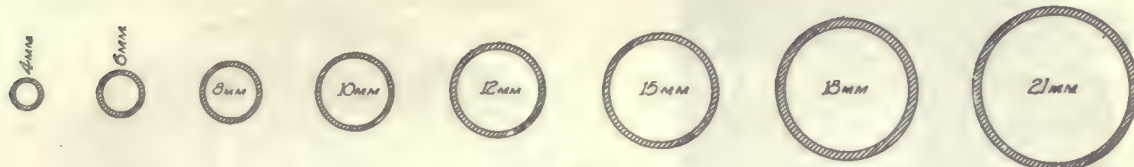
No. 7194.

No. 7196.



No. 7200.

No. 7202.



No. 7206.



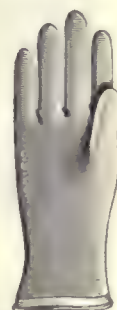
No. 7230.



No. 7232.



No. 7234.



No. 7242.

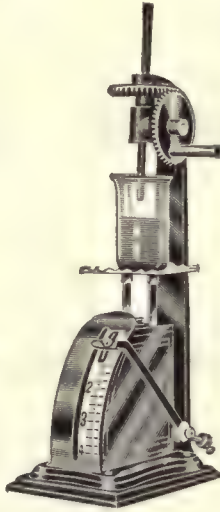
7194. **GLASS TUBES, Bomb**, for Carius and other explosion furnaces, of heavy soft glass, with one end closed. Length, 60 cm; diameter outside, 25 mm..... \$1.25
Note:—Other sizes will be made to order.
7196. **GLASS TUBES, Sealing**, of heavy soft glass with constriction for sealing off. Length, 70 cm; diameter outside, 25 mm..... 1.40
7200. **GLASS TUBING, Barometer**, heavy wall, outside diameter from 6 to 10 mm.
 Diameter of bore, mm..... 3 4 5
 Per pound..... .80 .80 .80
7202. **GLASS TUBING, Capillary**, from 5 to 7 mm outside diameter.
 Diameter of bore, mm..... $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$ 1 $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$
 Per pound..... 1.00 1.00 1.00 1.00 1.00 1.00 1.00
7206. **GLASS TUBING, Combustion, Pyrex**, of the same composition as the Pyrex boiling ware. Its high melting point, low coefficient of expansion and resistance to mechanical stresses, make it especially adapted for combustion work. In 36 inch lengths only, unless specified in ordering, when 72 inch lengths may be had.
 Diameter, inside, mm..... 4 6 8 10 12 15 18 21
 Thickness of wall, mm..... 1.2 1.2 1.2 1.2 1.5 1.5 2 2
 Per pound..... 1.00 1.00 1.00 1.20 1.20 1.20 1.50 1.50
- GLASS TUBES, Combustion**, see **Combustion Tubes**, page 163.
7212. **GLASS TUBING, Thermometer**, with white back, 6 to 7 mm in diameter..... Per pound \$0.75
7220. **GLASS WOOL** for filtering, etc..... Per ounce .50
- GLOBES, Deflagrating**, see **Deflagrating Globes**. Per pound 6.00
7230. **GLOVES, Asbestos Mittens**, 11 inches long.
 Size..... medium large
 Per pair..... 3.25 3.25
7232. **GLOVES, Asbestos, Fingerted**, 11 inches long.
 Size..... medium large
 Per pair..... 3.75 3.75
7234. **GLOVES, Asbestos, Fingerted**, same as No. 7232, but with gauntlet to protect wrists.
 Size..... medium large
 Per pair..... 4.25 4.25
7240. **GLOVES, Rubber, black**, medium weight..... per pair .75
 Sizes 6 to 10. (Example: Kid Glove No. 8 takes Rubber Glove No. 10.)
7242. **GLOVES, Rubber, tight fitting**, made of thinnest pure gum, as used by surgeons in operating.
 Sizes 6 to 10..... per pair 1.00
 Kindly give size of usual kid glove in ordering.



No. 7246.



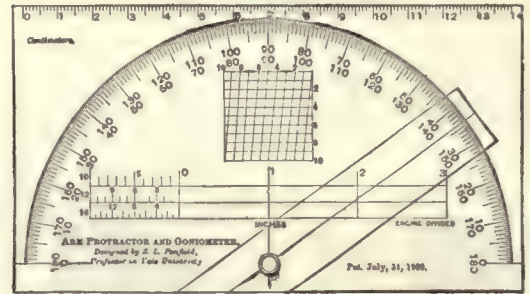
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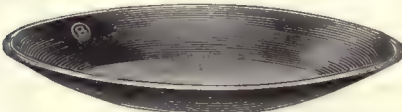
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No. 7274.



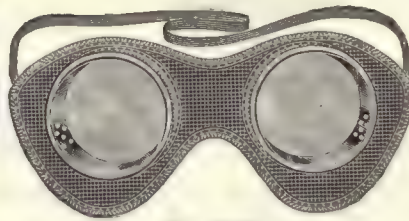
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No. 7286.



No. 7270.



No. 7272.



No. 7284.

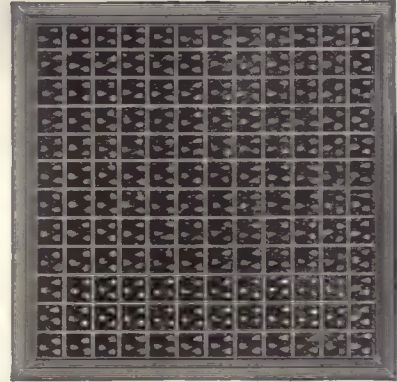
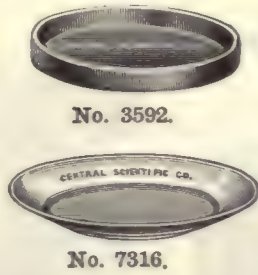
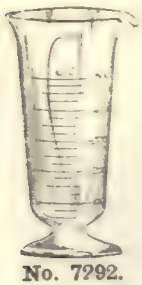
7246. **GLOVES, Rubber, Acid Gloves, loose fitting, heavy, gauntleted.**

Sizes for women, 6 to 9..... per pair \$2.50

Sizes for men, 10 to 12..... per pair 2.50

7254. **GLUE, Le Page's.**

	Size	Bottle		Can			
		Small	Large	2 oz.	4 oz.	8 oz.	1 lb.
7256.	Each	.15	.20	.25	.40	.60	1.00
7264.	GLUE, Marine, waterproof.....						per ounce bottle .25
7270.	GLUE TESTER, Scott's, for comparing tensile strength of jelly, glue, etc. Can also be used for grease, waxes, etc. Reads in pounds and fractions of ounces up to 3 pounds.....						25.00
7272.	GOGGLES, Rubber, gas tight, with clear glasses lined with mica to prevent transmission of heat.....						1.20
7274.	GOGGLES, Colored Glass, for protecting the eyes, mounted in metal frame with soft leather shields.....						.40
7274.	GOGGLES, Blue Glass, called Bessemer glasses. Widely used for inspection work in connection with steel furnaces, cement kilns, etc.....						1.20
7280.	GOLD BEATER'S SKIN, 6 inches square.....						.10
7284.	GOLD WASHING HORN, of polished copper, 9 inches long.....						.80
7286.	GOLD WASHING PANS, of polished steel. 16 inches in diameter; 2½ inches deep....						1.00
7288.	PROTRACTOR AND GONIOMETER, Penfield's. A graduated semicircle printed on a heavy card, with an arm of transparent celluloid, swiveled on an eyelet at the center of the semicircle. A fine index line on the under side of the celluloid arm indicates the angle. The instrument is also an accurate goniometer for measuring plane angles. The millimeter scale, English diagonal scale, scales for 10ths, 12ths, and 16ths of inches, and graduation of the semicircle are all engine divided. Each instrument placed in a stout manila envelope with complete printed instructions by Prof. Penfield. Dimensions about 8x15 cm.....						.60



No. 7310.

No. 7322.

7289. **CONTACT GONIOMETER, Penfield's Model A.** For measuring internal angles and for use where an arm protractor cannot be employed. Consists of two pairs of measuring arms with separate protractor, about 8x15 cm. \$0.60
7290. **CONTACT GONIOMETER, Penfield's Model B.** As it is difficult to adjust a transparent edge in exact contact with some surfaces, a modified form of No. 7288 is made for measuring crystals, having the celluloid arm opaque for a portion of its length. Dimensions about 6x10.5 cm. .60
- For other **PROTRACTORS**, see **Catalog F of Physical Apparatus.**
- GRADUATES, Cylindrical, see Cylinders, Graduated.**
7292. **GRADUATES, Glass, Cone Shape, metric measure.**
- | | | | | | | | |
|-------------------|-----|-----|-----|-----|-----|------|------|
| Capacity, cc..... | 30 | 60 | 100 | 200 | 250 | 500 | 1000 |
| Each | .36 | .40 | .45 | .60 | .65 | 1.00 | 1.70 |
7294. **GRADUATES, Glass, Cone Shape, metric and English measure, double graduation.**
- | | | | | | | | |
|------------------------|-----|-----|-----|-----|-----|------|------|
| Capacity, ounces | 1 | 2 | 3 | 6 | 8 | 16 | 32 |
| Capacity, cc..... | 30 | 60 | 100 | 200 | 250 | 500 | 1000 |
| Each | .38 | .50 | .56 | .76 | .90 | 1.30 | 2.20 |
7296. **GRADUATE, Glass, Cone Shape, new form, of heat resisting glass, permitting the use of hot liquids with minimum danger of breakage. The graduations are on the inside, being produced in such a way as to render them mathematically accurate. As the marks are in direct contact with the liquid, accurate adjustments are easily made. Graduated to 250 cc and to 8 ounces.....** .75
- GRADUATED FUNNEL for Creosote, see Funnels.**

GRAIN TESTING APPARATUS

BALANCES, Grain Testing, see general heading Balances.

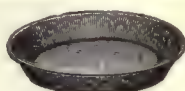
BALANCE WEIGHTS, see Balances.

BOTTLES, Grain Sample, see Nos. 1756 and 1758.

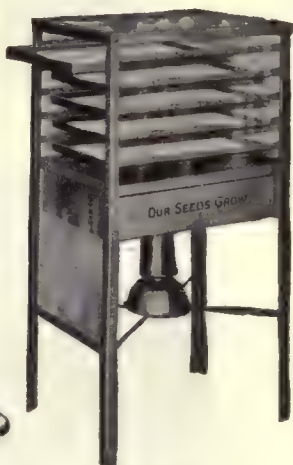
7310. **GERMINATING BOX** for showing proper depth to plant seeds. Of galvanized iron 15 inches long by 8 inches high, with glass front and back $\frac{3}{4}$ of an inch apart, making it easy to observe the germination of seeds planted at different depths. Complete with metal shields to exclude light from the sides. (See Farmer's Bulletin No. 218 of the United States Department of Agriculture)..... 3.75
7312. **GERMINATING BOX, Ganong Pattern, for sprouting and observing root growths.** Light, rust-proofed metal box with inclined glass front. Dimensions, $7\frac{1}{2}$ inches long, 5 inches deep, $5\frac{3}{4}$ inches wide at the top, 4 inches wide at the bottom..... .90
7314. **GERMINATING PLATE, of heavy glazed earthenware, 10 inches in diameter. For holding moist blotting paper in germination experiments** .30
7316. **GERMINATING PLATE, of porous clay, 9 inches in diameter. Obviates the use of blotting paper in germination experiments.....** .24
3592. **GERMINATING PLATE, of porous clay, $4\frac{1}{8}$ inches in diameter by $\frac{7}{16}$ inch deep, with straight sides** .20



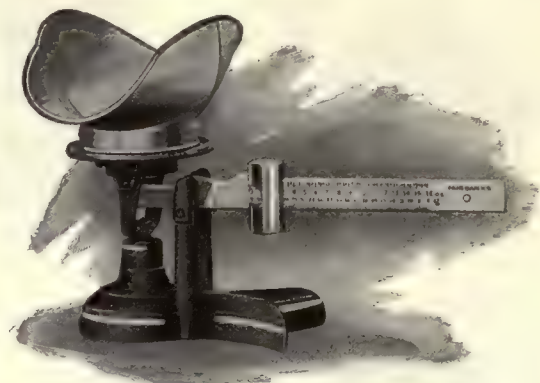
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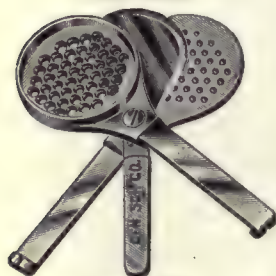
No. 7320.



No. 7324.



No. 552.



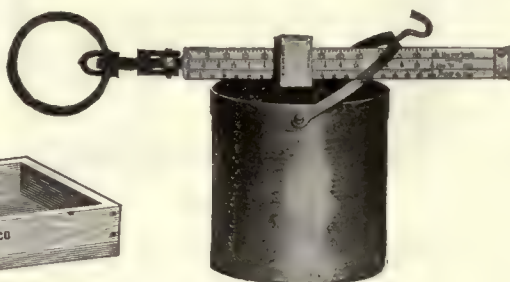
No. 7344.



No. 7330.



No. 7324.



No. 7346.

7320. **GERMINATING PLATE**, of graniteware, 11 inches in diameter by $1\frac{1}{4}$ inches deep. For use with moist blotting paper in germination experiments \$0.35
7322. **GERMINATING TRAY**, of water-proofed wood, 25x25x $2\frac{1}{4}$ inches deep, for testing fertility of corn and other grain. A frame which fits into the tray is divided into 144 squares which may be numbered if desired. (For illustration, see preceding page)..... 5.50
7324. **GERMINATING TRAY**, of wood, 18x10x2 inches deep..... 2.00
7328. **GERMINATION OR SPROUTING APPARATUS**, Schoenjahn's Patent, for quickly determining the percentage sprouting value of barley, showing its malting quality. Equally efficient in showing sprouting value of all grains. Capacity, 100 grains. Complete with directions for use..... 7.50
7330. **GERMINATION OR SPROUTING CUP**, as described in Bulletin No. 35 of the Rhode Island Experiment Station, and on page 14 of Bailey's "Nursery Book." Of porous clay 3 inches in diameter by $1\frac{1}{4}$ inches high, with ventilated cover and glass dish..... .50
7336. **GERMINATION TESTER**, Sho-Gro, oil heated, constructed throughout of non-rustable metal and glass. It has a capacity of 5 trays, each measuring 10x15 inches, so that a large number of samples may be accommodated at one time. The outside measurements over all are 32 inches high, 13 inches wide, and 17 inches deep. Since all sides are of glass, the progress of the test is always in view. Complete with 24 blotters, a supply of dividing strips and oil lamp for heating..... 15.00
7338. **GERMINATION TESTER**, Sho-Gro, same as No. 7336, but electrically heated, with switch for three heats 23.00

In ordering, kindly state voltage of circuit.

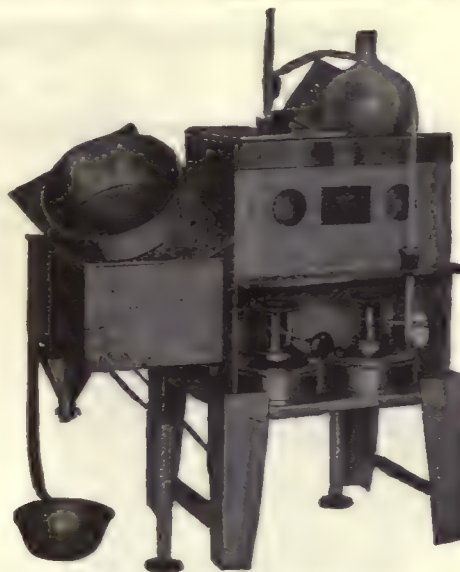
GRAIN CONTAINER of galvanized iron, see **Bins and Containers**.

552. **GRAIN OR SEED SCALE (Dirt Scale)**, for ascertaining the percentage of dirt in grain or seed. The beam has two rows of marks, the upper indicating the weight, one pound by quarter ounces; the lower the percentage of dirt. In use a sample pound is weighed, sifted, and replaced in the scoop. The poise is then run back until the beam balances. The lower row of marks shows the percentage of loss by dirt removed, i. e., the percentage of dirt contained in the seed. Complete with brass scoop..... 12.00
7344. **GRAIN TESTER**, Grobecker's, of nicked brass, for determining rapidly the farinaceous condition of barley and malt. Fifty kernels may be cut through at a time..... 9.00
7346. **GRAIN TESTERS**, of best construction, highly polished and lacquered. When the cup is empty the beam balances with the poise set at zero. Beam has three rows of graduations which indicate the number of pounds per bushel of sample, the exact weight of sample, and the percentage of loss in cleaning.

Capacity	1 pt.	1 qt.	2 qt.
Each	18.00	20.00	22.00



No. 7347.



No. 7362 (including No. 7374).

7347. **GRAIN TESTER FILLERS**, for use with No. 7346 Grain Testers. This device is of special value when accurate testing is desired, since it allows the grain to flow in a uniform stream and insures a uniform density in the cup. Complete with polished steel rod for striking off.
- | | | |
|-----------------------|--------|-------|
| Capacity, quarts..... | 1 | 2 |
| Each | \$8.00 | 10.00 |

Note:—The above fillers may be used with any grain testers of capacity equal to or smaller than that of the filler.

MAGNIFIERS, for Grain, see general heading **Magnifiers**.

MOISTURE TESTERS, Official **Brown-Duvel**, developed primarily to meet the needs of grain dealers for a rapid and exact method of determining the moisture in corn. Methods have now been worked out for making moisture tests of the more important cereal grains and some of the more important seeds, as well as for flour and ground grain. The method is entirely practicable for making moisture determinations of practically all substances which admit of a free circulation of oil during the heating. The apparatus consists of a heating chamber divided into compartments for testing a number of samples at the same time; a cold water tank through which condenser tubes pass; burners; thermometers; special side neck flasks; graduated cylinders; and No. 7374 Automatic Oil Measuring and Grain Separating Device. Testers B, C and D are 12½ inches wide and 31 inches high. No. A is especially adapted for field work and is put up in a carrying case 11 by 7 by 15 inches; weight complete, 19 pounds. These testers are the standard form as specified in Paragraph 11 of the Federal Corn Grades, effective July 1, 1914. (See Bulletins Nos. 56 and 99, and Circular No. 72, Bureau of Plant Industry, United States Department of Agriculture.)

No.	A	B	C	D
Number of compartments.....	1	2	4	6
Length, inches.....	6½	13	26	39
7360. With gas burners.....	27.00	40.00	55.00	70.00
7362. With alcohol burners.....	27.00	40.00	55.00	70.00
7364. With electric heaters.....	35.00	56.00	87.00	118.00

Note:—In ordering No. 7364, kindly state voltage of circuit.

Parts and Accessories for Moisture Testers.

5698. FLASK, Pyrex Glass, 1000 cc.....	1.50
5702. FLASK, Copper, single wall, 1000 cc.....	3.00
5704. FLASK, Copper, double wall, inner vessel 900 cc	6.00
7368. CONDENSER TUBE, of glass.....	.30
3662. GRADUATED CYLINDERS, 25 cc, graduated in ¼ cc.....	.65
3664. GRADUATED CYLINDER, new design; for use when 50 gram samples are being tested. With this graduate the percentage of water up to 16 per cent., is given by direct reading without the necessity of multiplying by two, as with the original graduate.....	.85
7371. OIL for moisture testers, according to the specifications of the Bureau of Plant Industry, in metal cans.	
No.	A B
Capacity, gallons.....	1 5
Each .....	.90 3.25
7372. RUBBER STOPPERS, especially designed to stand the high temperature existing in moisture test flasks; are absolutely necessary when copper flasks are used.	
No.	5 6
Per dozen.....	1.65 2.20



7373. **THERMOMETER**, graduated from 0° to 200° Centigrade, specially designed for moisture testers \$2.00
7374. **AUTOMATIC OIL MEASURING AND GRAIN SEPARATING DEVICE**, consisting of a galvanized iron tank, re-enforced strongly with brass, and so mounted on brackets that it can readily be attached to any of the moisture testers; fitted with a measuring device which automatically measures out 150 cc of oil into test flask by merely pushing the neck of the flask upward against an automatic catch. The cover of the tank is fitted with a funnel-shaped sieve, which catches the mixture of grain and oil as it is poured from the flask after the test, and strains the oil into the container below. In this way the oil is kept free from dust and dirt, and the same oil may be used repeatedly..... 5.00
7380. **PANS, Sample**, of aluminum; for use in sampling and inspecting grains, with one end formed into a spout for pouring out contents. Strong, light, and well made; will not rust or tarnish; upward pitch of spout prevents grain from rolling out. Recommended in Bulletin No. 99 of the Bureau of Plant Industry. Size 9x6x1½ inches.....each 1.40
- PROTEIN DETERMINATION APPARATUS FOR GRAIN**, see general heading, **Nitrogen Determination Apparatus**.
7382. **SAMPLER, Bag**, for sampling small seeds in sacks. Diameter, 7/32 inch; length, 4¼ inches 1.10
7384. **SAMPLER, Bag**, similar to No. 7382, but for grains. Diameter, 3/8 inch; length, 6 inches... 1.50
7386. **SAMPLERS, Grain**, consisting of two polished brass tubes, one fitted inside of the other, and having openings matching each other. By turning the handle, the inner tube is revolved, thus opening and closing the holes.
- | No. | A | B | C |
|-----------------------|------|-------|-------|
| Diameter, inches..... | 1¼ | 1½ | 1¾ |
| Length, inches..... | 44 | 44 | 52 |
| Each | 9.00 | 12.00 | 12.25 |
7398. **SIEVE, Corn Test**, of aluminum, according to specifications of the United States Department of Agriculture, consisting of one sieve with 1¼/64 inch round holes and one bottom pan, nested, 13 inches in diameter by 3 inches deep.....per set 4.50
7402. **SIEVES, Wheat Dockage**, according to Government specifications, consisting of a set of four sieves, 13 inches in diameter, and bottom pan, constructed of aluminum, telescoping. Consists of a buckwheat sieve with 8/64 inch triangular perforations; a fine seed sieve with 1/2 inch round perforations; a scalper sieve with 12/64 inch round perforations; and a chess sieve with perforations 4½/64 by ½ inch. (See Regulatory Announcement No. 22 of Federal Wheat Grades effective July 1 and August 1, 1917)..... 8.00

SPROUTING MEDIA

7410. **PROPAGATING SAND**, best quality, clean and fertile.....per peck .50
7412. **SAWDUST**, for germinating trays, specially selected.....per peck .25
7414. **SPHAGNUM MOSS**, best quality, for germinating boxes.....per pound .25
5732. **SULPHUR DETERMINATION APPARATUS**, for determining whether grain has been bleached, as recommended in Circular No. 111 of the United States Bureau of Plant Industry. Consists of an Erlenmeyer flask with ground in stopper and connecting tube. Capacity, 500 cc 1.95

For **SEED AND GRAIN SAMPLES AND TYPES**, send for Catalog of Agricultural Apparatus.



No. 7422.



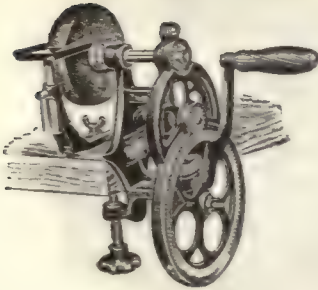
No. 7464.



No. 7466.



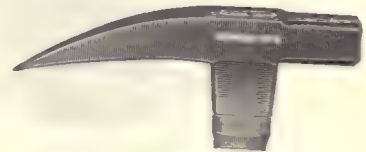
No. 7484.



No. 7424.



No. 7460.



No. 7468.

For GOUGES see Chisels.

7422. **GRINDSTONES.** Selected Berea grindstones, rubbed smooth, mounted in a cast iron trough, with pressed steel base, steel shaft and steel ball bearings. Shipped knocked down.

Diameter, inches	6	10
Each	\$2.90	3.60

7424. **GRINDER,** with clamp for fastening to table 2 inches thick or less. High quality abrasive wheel 4 inches in diameter, 1 inch face; gears enclosed for protection. 7.00

HACK-SAWS, see Saws.

HAEMATOLOGY APPARATUS, see Blood Testing Apparatus.

7460. **HAMMERS,** of cast steel, wedge shaped, for breaking ore.

No.	A	B
Weight, ounces	7	16
Each	.85	1.00

1488. **HAMMER, Blowpipe, Plattner's,** with wooden handle. .45

7466. **HAMMERS, Claw, cast steel.**

No.	A	B
Weight, ounces	7½	13
Each	1.15	1.25

7468. **HAMMER, Prospecting Pick,** of cast steel, square head with flat face. Pick point of hardened steel. Weight 1½ pounds. 2.30

HAND TALLY, see Counter No. 3318.

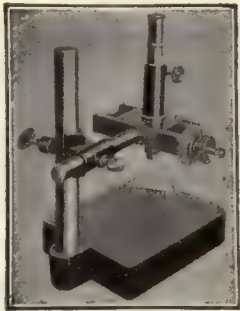
HARDNESS TESTERS

For a full discussion of methods of measuring hardness of metals, see Technologic Paper No. 11 of the United States Bureau of Standards.

7484. **HARDNESS TESTER, Brinell Ball Type,** for maximum pressure of 3,000 kilograms, for determining comparative hardness by the Brinell ball indentation method. This instrument is considered the standard for hardness tests and is widely used by steel manufacturers and users throughout the world. The machine is of the hydraulic type, using glycerine as the pressure medium. The press is so constructed that no air can leak in behind the plunger. A special feature of this method is the automatic depth gage by which the depth of the indentation may be read directly without calculation and the corresponding Brinell number obtained from a table supplied with each machine. Shipping weight, 700 pounds. Complete as described, filled with glycerine, but without Automatic Depth Gage. 315.00



No. 7485.



No. 7486.



No. 7487.



No. 7492.

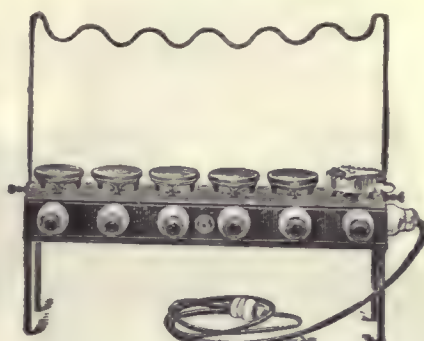
7485. **AUTOMATIC DEPTH GAGE** for reading directly in hundredths of a mm the depth of indentation of the Brinell sphere. The depth of the indentation has been shown by the United States Bureau of Standards to be the correct method of comparing the hardness of metals. The total scale of 150 represents an indentation of $1\frac{1}{2}$ mm. Complete in leather covered case. \$65.00
7486. **MICROMETER MICROSCOPE** for use with No. 7484 Hardness Tester for those who wish to measure the diameter of indentation. Reads directly in mm to an accuracy of 0.001 mm. Height of support, 12 inches; length of side arm, 8 inches. Complete with achromatic objective of 42 mm focus, ocular with stationary cross hairs, rack-and-pinion movement for focusing and graduated micrometer screw for lateral motion mounted on heavy support with universal adjustment..... 65.00
7487. **BRINELL MAGNIFIER**, hand type, for reading approximately the diameter of the indentation. Consists of a magnifying lens and a small steel rule graduated in fifths of a mm. Readings can be made to $\frac{1}{10}$ mm..... 10.00
7492. **HARDNESS TESTER, Brinell Meter**, a portable instrument for determining the hardness of metals by comparing the diameters of the depressions produced in the test piece and a standard piece of known hardness, by a sphere under the influence of the same force. The advantages of such an instrument over other types are its portability, unlimited range of application, rugged construction and convenience in operation. Complete with one Brinell Meter, 12 standard 10mm balls, 6 standard bars of carefully determined Brinell hardness, 2 special scales for measuring the diameter of indentation, key for opening instrument and a set of direct-reading tables, with instructions for use, in leather covered carrying case, 9x6 inches; total carrying weight, $6\frac{1}{2}$ pounds. (Unless specified, 3 bars of hardness 170 Brinell and 3 of 250 Brinell will be sent.) Descriptive booklet will be sent upon request..... 55.00
7493. **STANDARD BARS** for No. 7492.....each .75
(In ordering, specify degree of hardness desired, and give serial number of instrument with which they are to be used.)
7494. **STANDARD STEEL BALLS** for No. 7492, exactly 10 mm in diameter.....per dozen 1.00
7495. **MEASURING SCALES** for No. 7492, graduated to $\frac{1}{20}$ mm, for reading to $\frac{1}{40}$ mm.
- | No. | A | B |
|------------------|------------|--------|
| Reading, mm..... | 1.5 to 3.5 | 3 to 5 |
| Each | .15 | .15 |



No. 7498.



No. 7498.



Nos. 7508-9.



No. 7500.



No. 7512.

- 7498. HARDNESS TESTER, Scleroscope, Shore's**, for determining the comparative hardness of metals. The method consists in dropping a small hammer from a fixed height upon the piece being tested, and measuring the height of the rebound upon the scale, which reads directly in degrees of hardness. Complete with Scleroscope, platermount vessel, stand with swinging arm, magnifier, hammer for soft metals, one each brass and hard steel, calibrated reference bars, and 50 blank curve charts in polished wood carrying case. **Descriptive booklet sent upon request** \$170.00

HARDNESS SCALE, see **Blowpipe Apparatus**.

- 7500. HATCHET**, high grade steel, black finish, polished face and bevel, selected white hickory handle, 3½ inch bit..... 1.25

HEAT GAGES, see **Pyrometers**.

HEATERS, Electric, for **Extraction Apparatus**, see **Extraction Apparatus Heaters**, Nos. 5260 to 5272.

HEATERS, Electric, for ether extractions, Kjeldahl digestions, etc. Consists of six electric hot plates, 3½ inches in diameter, mounted on a sheet iron box. Each heater has its own switch, enabling any number to be used at a time. Length, 24 inches; width, 5½ inches; height, 9 inches. Complete with rack for Kjeldahl flasks, and with connecting cord and plug.

No.	A	B
	Number of hot plates.....	6 10
	Length, inches.....	24 40
7508.	For 110 volts.....	57.75 90.75
7509.	For 220 volts.....	57.75 90.75

- 7512. HEATER, Cenco Electric**, for **Volatile Fluids**, designed by W. H. Ross, consisting of a box 80x20x12 cm of asbestos board containing a system of resistance coils, above which is supported a sheet iron pan. The top of the outer box is removable and has openings for flasks which rest on the bottom of the iron pan below. A switch arrangement permits the use of currents of from 1 to 4 amperes at 110 volts, the change from minimum to maximum being made in nine steps if desired. With top removed, the heater becomes an ordinary hot plate. By placing a liquid in the iron box the heater becomes a liquid bath. Complete with covers for holes 37.50



No. 7514.



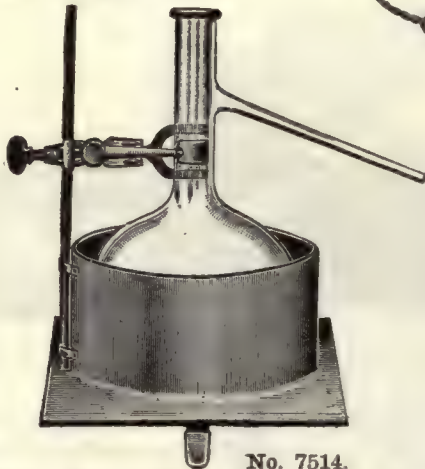
No. 7514.



No. 7522.



No. 7520.



No. 7514.



No. 7518.

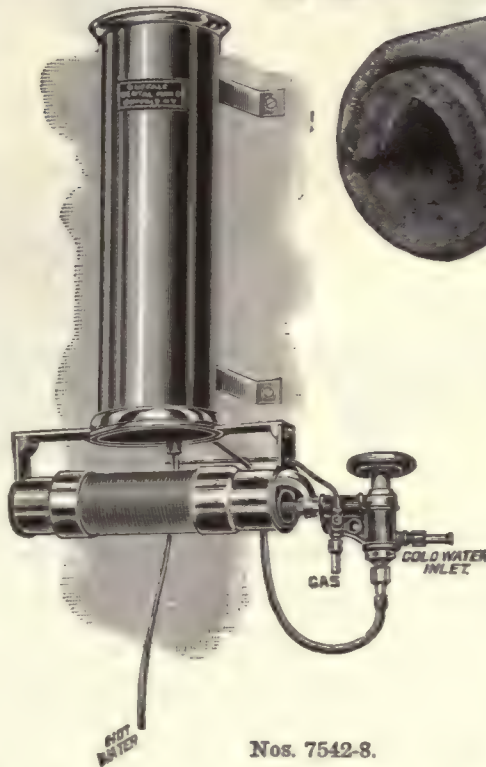
- 7514. HEATERS, Electric Combination Flask, Sand Bath, and Hot Plate.** Constructed with replaceable unit, and with housing of heavy sheet steel containing rheostat for temperature control. Upper part of casing is flanged to form slide for several appliances. Maximum temperature obtainable, 540°C. (1000°F.), which can be controlled sufficiently low for ether extractions. Complete with Hot Plate Slide, 8x9 inches; Flask Heater Attachment, 6x3 $\frac{3}{4}$ inches; two Sand Bath Attachments, 4 and 6 inches by 3 $\frac{3}{4}$ inches deep; and with connecting cord and plug.
- | No. | A | B |
|----------------|---------|-------|
| For volts..... | 110 | 220 |
| Each | \$42.50 | 42.50 |
- 7515. EXTRA HEATING UNITS for No. 7514.**..... 4.00 4.00
- 7518. HEATERS, Electric Immersion Coils, for heating water baths, thermostats, etc., with three heats. Complete with five-foot cord and regulating switch. May be used on either A.C. or D.C.**
- | No. | A | B | C |
|---|-----------------|-----------------|-----------------|
| Diameter of coil, inches..... | 6 $\frac{1}{2}$ | 8 $\frac{1}{2}$ | 11 |
| Depth of coil, inches..... | 3 | 4 | 4 $\frac{1}{2}$ |
| Height from bottom of coil to bottom of handle, inches..... | 9 | 13 | 18 |
| Minimum power consumption, watts..... | 110 | 275 | 500 |
| Maximum power consumption, watts..... | 440 | 1100 | 2000 |
| Each | 15.50 | 22.00 | 33.00 |
- In ordering, kindly state voltage.**
- 7520. HEATERS, Electric Immersion, Cylindrical form, made of copper and brass, nickel-plated.** Diameter of cylinder, $\frac{3}{4}$ inch; length of heater, 7 inches; weight, $\frac{3}{4}$ pound; power consumption, 350 watts. Complete with connecting cord, attachment plug and special switch-plug.
- | No. | A | B |
|----------------|------|------|
| For volts..... | 110 | 220 |
| Each | 4.50 | 5.50 |
- 7522. HEATERS, Electric Immersion, Portable Disk Type, for use in water baths, paraffine baths, etc.; made of non-corrosive metal throughout. Complete with six feet of connector cord, separable attachment plug, connection plug and through switch. For 110 volt circuit only.**
- | No. | A | B | C |
|-------------------------------|-----------------|-----------------|------|
| Diameter of disk, inches..... | 3 | 4 | 5 |
| Length of handle, inches..... | 7 $\frac{3}{4}$ | 8 $\frac{1}{2}$ | 9 |
| Power consumption, watts..... | 250 | 425 | 660 |
| Number of heats..... | 1 | 3 | 3 |
| Shipping weight, pounds..... | 2 | 3 | 4 |
| Each | 6.00 | 9.00 | 9.50 |



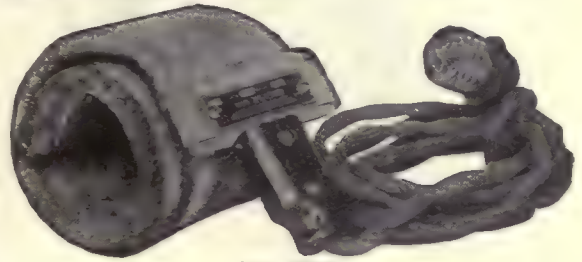
Nos. 7526-7.



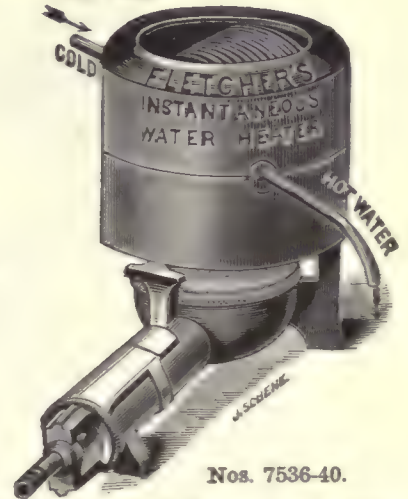
Nos. 7524-5.



Nos. 7542-8.



No. 7528.



Nos. 7536-40.

HEATERS, Electric Immersion, DeKhotinsky, for use in water baths, incubators, etc., consisting of two units, contained in non-corrosive metal tubes, connected in parallel. Unless specified in ordering, 230 watt heater containing two 115 watt units will be sent. Selection may be made from the list of units given under Nos. 7526 and 7527.

No.	A	B	C	D
Length of heater tubes, inches.....	8	12	18	24
7524. For 110 volts.....	\$12.00	12.50	13.00	13.50
7525. For 220 volts.....	13.00	13.50	14.00	14.50

UNITS, DeKhotinsky Standard Heating, for use in Nos. 7524 and 7525 Electric Heaters, of Chromel wire wound on lavite. They can be easily installed, requiring only a screw driver for removal and insertion.

No.	A	B	C	D	E
Wattage	44	60	75	115	140
7526. For 110 volts.....	1.00	1.00	1.00	1.00	1.00
7527. For 220 volts.....	1.25	1.25	1.25	1.25	1.25

7528. **HEATER, Despatch Flexible Electric**, very convenient for use in the laboratory as its flexibility permits it to be wrapped about a bottle, beaker or other object to be heated. Thoroughly insulated and safe to handle. Length unrolled, 16 inches; width, 3½ inches; thickness, ½ inch; current consumption, 300 watts. For 110 volts only..... 7.00

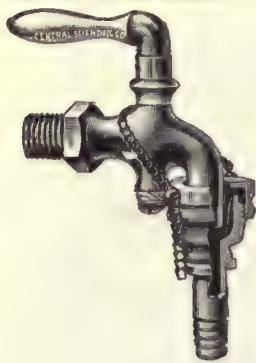
HEATERS, Flask, sheet iron, see Flask Heaters.

7536. **HEATER, Instantaneous Water**. Gives hot water in three seconds after the gas is lighted, and in one minute will give sufficient hot water for washing hands. Total height, 9 inches; gas supply required, ¾ inch clear bore pipe and tap; maximum gas consumption 60 cubic feet per hour. Illustration shows the heater on No. 2082 Burner. Heater complete, without burner 7.00

7538. **HEATER, Instantaneous Water**, same as No. 7536, but with Burner No. 2082 for illuminating gas..... 9.00

7540. **HEATER, Instantaneous Water**, same as No. 7536, but with Burner No. 2084 for gasoline gas..... 10.40

7542. **HEATER, Instantaneous Water**, specially designed for lavatory, general laboratory and domestic use; it will heat one pint of water per minute from 50°F. to 130°F. or will boil 4 gallons per hour. A pilot light attachment keeps the water in the coil constantly warm when the water is not running and automatically lights the burner when the gas is turned on. Height over



No. 7562 (in use).



No. 7556.

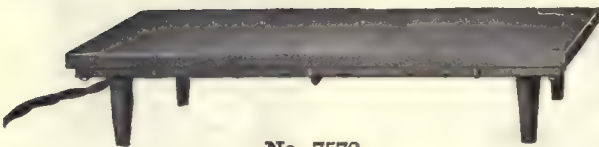


A

No. 7558.



B



No. 7572.



No. 7570.

all, 18 inches; projection from wall, 6 inches; gas supply required, $\frac{3}{8}$ inch clear bore pipe; maximum consumption per hour, 20 cubic feet of gas. Complete with coupled taps and pilot light \$33.00

7544. **HEATER, Instantaneous Water, same as No. 7542, but equipped with burner for gasoline gas** 34.00

7546. **HEATER, Instantaneous Water, similar to 7542, but larger with twice the capacity. Height over all, 19 inches; projection from wall, 8 inches; gas supply required, $\frac{3}{8}$ inch clear bore pipe; maximum consumption per hour, 40 cubic feet of gas. Complete with coupled taps and pilot light** 39.00

7548. **HEATER, Instantaneous Water, same as No. 7546, but equipped with burner for gasoline gas** 40.00

HONES, see Microtome Accessories.

HOSE, Rubber, see Rubber Tubing.

7556. **HOSE CONNECTOR, brass, for rubber tubing, with thread for ordinary hydrant or kitchen bib.**70

7558. **HOSE CONNECTORS, brass, for smooth faucets. For $\frac{1}{2}$ inch faucet.**
No. A B
Each65 .65

7560. **HOSE CONNECTORS, brass, same as No. 7558, for $\frac{5}{8}$ inch faucet.**
No. A B
Each75 .75

7562. **HOSE CONNECTOR, Universal, not threaded, but merely slipped on a faucet and fastened with a chain. Can be quickly attached to any water faucet. The simplest device for attaching filter pumps, stills, water motors, turbines and centrifuges to a common faucet. It is practical, self-tightening and air tight.** 2.00

7570. **HOT PLATES, Electric, round form, three heat, mounted on enameled slate base with regulating switch and furnished with six feet of cord, but without lamp socket plug except Nos. A and B. May be used on either alternating or direct current circuits.**

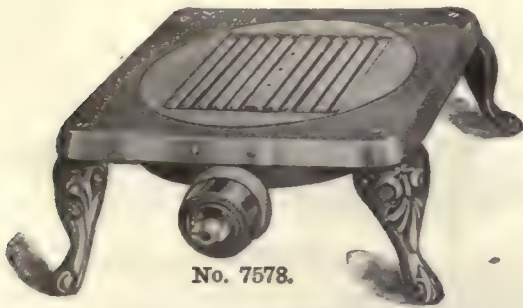
No.	A	B	C	D	E
Diameter, inches.....	4 $\frac{1}{2}$	6	8	10	12
Power consumption, minimum watts.....	83	150	250	275	325
Power consumption, maximum watts.....	250	440	735	1100	1300
Each	6.50	9.00	14.00	20.00	28.00

In ordering kindly state voltage.

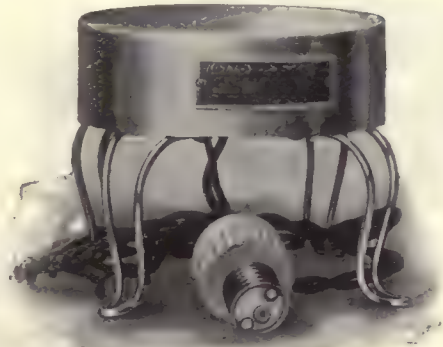
7572. **HOT PLATES, Electric, rectangular form, three heat, with 4 feet of cord but without lamp socket plug. Nos. A and B have three plug switches; C and D have snap switches.**

No.	A	B	C	D
Size, inches	9x12	12x18	18x24	4 $\frac{1}{2}$ x24
Power consumption, minimum watts.....	300	550	1000	150
Power consumption, maximum watts.....	880	1550	2800	600
Each	22.00	29.00	50.00	16.00

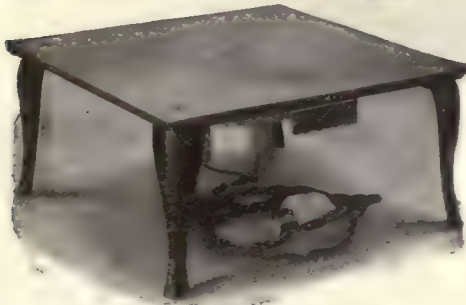
In ordering kindly state voltage.



No. 7578.



No. 7588.



No. 7592.



No. 7582.

7578. **HOT PLATE, Electric, Grid Type**, three heat, with heating surface $10\frac{1}{2} \times 10\frac{1}{2}$ inches; height of plate, $4\frac{1}{2}$ inches. A greater amount of heat may be obtained from this plate than from other forms, as the heating unit is in the open and direct radiation is obtained. Provided with switch giving three heats, consuming 220, 440 and 880 watts; finished in nickel-plate. Shipping weight, 17 pounds. Complete with 7 feet of connecting cord and attachment plug.

No.	A	B
For volts.....	110	220
Each	\$10.00	10.00

7580. **HOT PLATE, Electric, Grid Type**, similar to No. 7578, but with two burners, giving heating surface 10×20 inches; each burner has a separate three heat switch. Current consumption with left hand burner, 220, 440 and 880 watts; with right hand burner, 375, 750 and 1500 watts. Height of plate, $5\frac{1}{2}$ inches; shipping weight, 35 pounds.

No.	A	B
For volts.....	110	220
Each	22.50	22.50

7582. **HOT PLATE, Electric, Grid Type**, similar to No. 7578, but with three burners giving a heating surface $14 \times 32\frac{1}{2}$ inches. Each burner has a separate three-heat switch. Current consumption with left hand burner, 125, 250 and 500 watts; with center burner, 275, 550 and 1100 watts; with right hand burner 375, 750 and 1500 watts. Height of plate, $5\frac{1}{2}$ inches; shipping weight, 50 pounds.

No.	A	B
For volts.....	110	220
Each	32.50	32.50

7588. **HOT PLATE, Electric, Hoskins Type MA-101**, for use on either A.C. or D.C., with heating elements of Chromel wire guaranteed to last one year. With top of pressed steel, heavy bent wire legs, and spiral resistance unit. Heat distribution uniform over top. Very useful for evaporating solutions, drying precipitates, etc. Boils one liter of water from cold in 15 minutes. Diameter, 6 inches; power consumption, 500 watts; maximum temperature, 483°C . or 900°F . Complete with 6 feet of flexible cord and separable attachment plug.

No.	A	B
For volts	110	220
Each	8.00	8.00

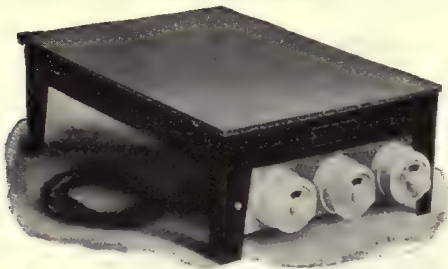
7589. **EXTRA HEATING UNITS** for No. 7578.

No.	A	B
Each	3.00	3.00

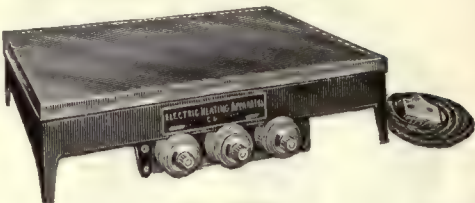
7592. **HOT PLATES, Electric, Hoskins Type MA-111**, for use on either A.C. or D.C. Size of plate, 12×12 inches. Requires only 5 amperes at 110 volts and $2\frac{1}{2}$ amperes at 220 volts. Heated at center, covering area $5\frac{3}{4}$ inches in diameter. Will boil one liter of water placed in the center from cold in 1 hour and 15 minutes. The cooler section around the center is useful for slowly evaporating to dryness contents of beakers, etc. Maximum temperature at center, 260°C . (500°F .); at edge, 121°C . (250°F .); power consumption, 500 watts. Complete with 6 feet of twin-conductor flexible cord with separable attachment plug.

No.	A	B
For volts.....	110	220
Each	12.00	12.00

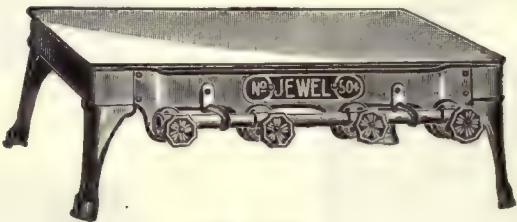
7593. **EXTRA HEATING UNITS** for No. 7592.....each 3.00 3.00



No. 7596.



No. 7602.



No. 7610.

7596. **HOT PLATE, Electric, Hoskins Three Heat**, for variable temperatures. Three heats are obtainable from parallel windings, each controlled by a snap switch on the front. High heat boils one liter of water from cold in 20 minutes. Size of hot plate, 12x18 inches; maximum temperature on low heat 246°C. (475°F.); on medium heat, 315°C. (600°F.); on high heat, 400°C. (750°F.); power consumption on low heat, 600 watts; on medium heat, 1200 watts; on high heat, 1800 watts. Mounted on four square steel legs with polished steel top, complete with 6 feet twin-conductor flexible cord and separable attachment plug.

No.	A	B
For volts.....	110	220
Each	\$40.00	40.00

7597. **EXTRA HEATING UNITS** for No. 7596.....each 10.00 10.00

7602. **HOT PLATES, Electric, Multiple Unit Type, with replaceable units.** Can be used interchangeably on 110 and 220 volts. The method of construction forces heat to the top, providing a higher temperature than is usually attained with hot plates without increased current consumption. By shifting connections at the rear from the 110 volt to the 220 volt pins, the number of heats obtained on 110 volts is doubled. All sizes give a maximum temperature of approximately 750°F. (400°C.); on medium heat, 600°F. (315°C.); on low heat, 400°F. (205°C.) Made of cast iron with removable cast iron tops. Bases are finished in optical black.

No.	10	12	22	32	40
Size, inches	12¼x12¼	12¼x12¼	18x12¼	24x18	6½x18
Shipping weight, pounds.....	50	51	80	135	45
Number of heats.....	1	3	3	3	3
Power consumption on low heat, watts...	...	352	520	1070	285
Power consumption on med. heat, watts..	...	704	1030	2140	570
Power consumption on high heat, watts..	1056	1056	1550	3200	860
Each	26.50	30.00	40.00	67.50	25.00

7603. **EXTRA HEATING UNITS** for No. 7602.

Number required.....	2	2	2	2	4
Each	4.00	4.00	5.50	5.50	3.50

7610. **HOT PLATES or Drying Tables**, for use with gas. The top is of one piece of steel, with polished surface; the legs and frame are of cast iron. Flame easily regulated. Gives an even temperature.

No.	A	B	C
Size of plates, inches.....	10x18½	14½x18½	18½x25½
Number of burners.....	1	2	3
Each	12.50	16.25	26.25

7612. **HOT PLATES**, same as No. 7610, but for use with gasoline gas.

No.	A	B	C
Size of plate, inches.....	10x18½	14½x18½	18½x25½
Each	17.50	23.35	35.00

HOOR GLASSES, see Sand Glasses.

HYDROMETERS

HYDROMETERS FOR GENERAL USE



PLAIN HYDROMETER. Regular size, about 12 inches long. Four-ounce size, about 5 inches long.



THERMO-HYDROMETER. Regular size, about 14 inches long. Four-ounce size, about 7 inches long.

7622. **HYDROMETERS, Baumé, for heavy liquids, highest quality, graduated in $\frac{1}{10}^{\circ}$ divisions. Length about 11 inches.**

No.	A	B	C	D	E	F	G
Range, degrees Baumé.....	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Each	\$2.50	2.50	2.50	2.50	2.50	2.50	2.50

7624. **HYDROMETERS, Baumé, for heavy liquids, highest quality, graduated in $\frac{1}{4}^{\circ}$ divisions. Length about 11 inches.**

No.	A	B	C
Range, degrees Baumé.....	0-25	25-50	50-70
Each	2.00	2.00	2.00

7626. **HYDROMETERS, Baumé, for heavy liquids, highest quality, graduated in $\frac{1}{2}^{\circ}$ divisions. Length about 11 inches.**

No.	A	B
Range, degrees Baumé.....	0-35	35-70
Each	1.65	1.65

7628. **HYDROMETER, Baumé, for heavy liquids, medium grade, graduated from 0° to 70° in 1° divisions. Length about 11 inches.**

	.50
--	-----

7632. **HYDROMETERS, Baumé, for light liquids, highest quality, graduated in $\frac{1}{40}^{\circ}$ divisions. Length, about 11 inches.**

No.	A	B	C	D	E	F	G	H
Range, degrees Baumé....	90-80	80-70	70-60	60-50	50-40	40-30	30-20	20-10
Each	3.30	3.00	2.50	2.50	2.50	2.50	2.50	2.50

7634. **HYDROMETER, Baumé, for light liquids, highest quality, graduated from 40° to 10° in $\frac{1}{2}^{\circ}$ divisions. Length, about 11 inches.**

	1.65
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7636. **HYDROMETER, Baumé, for light liquids, medium grade, graduated from 100° to 10° in 1° divisions. Length, about 11 inches.**

	.50
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7640. **HYDROMETERS, Specific Gravity Scale, standard, for scientific work requiring highest degree of accuracy. Graduated at 60°F. , in 0.001 divisions; mercury weighted. Length, about $14\frac{1}{2}$ inches. Each hydrometer lettered as below:**

A .....	.700 to .760	K	1.300 to 1.360
B .....	.760 to .820	L	1.360 to 1.420
C .....	.820 to .880	M	1.420 to 1.480
D .....	.880 to .940	N	1.480 to 1.540
E .....	.940 to 1.000	O	1.540 to 1.600
F	1.000 to 1.060	P	1.600 to 1.660
G	1.060 to 1.120	Q	1.660 to 1.720
H	1.120 to 1.180	R	1.720 to 1.780
I	1.180 to 1.240	S	1.780 to 1.850
J	1.240 to 1.300		

Set of 19 hydrometers listed above, complete with a special 12-inch floating hydrometer, with thermometer scale in stem reading from 30° to 120°F. , in 1° graduations. The special hydrometer is marked with letters indicating which spindle to use. Set complete in wooden case

109.00

7641. **HYDROMETERS, single spindles only of No. 7640**

each 5.00

7642. **HYDROMETERS, Specific Gravity Scale, for heavy liquids, highest quality, graduated in 0.002 divisions. Length, about 11 inches.**

No.	A	B	C	D	E
Range	1.000-1.100	1.100-1.200	1.200-1.300	1.300-1.400	1.400-1.500
Each	3.00	3.00	3.00	3.00	3.00
No.	F	G	H	J	K
Range	1.500-1.600	1.600-1.700	1.700-1.800	1.800-1.900	1.900-2.000
Each	3.00	3.00	3.00	3.50	3.50



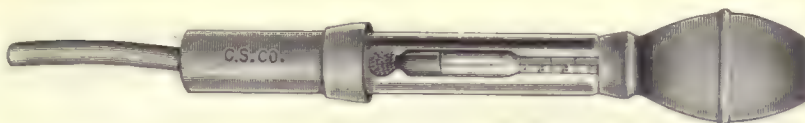
No. 7660.

7644. **HYDROMETERS, Specific Gravity Scale, for heavy liquids, medium grade, graduated in 0.005 divisions. Length, about 11 inches.**
- | No. | A | B | C | D | E |
|---------------------|-------------|-------------|-------------|-------------|-------------|
| Range, gravity..... | 1.000-1.200 | 1.200-1.400 | 1.400-1.600 | 1.600-1.800 | 1.800-2.000 |
| Each | \$0.75 | .75 | .75 | .75 | 1.00 |
7646. **HYDROMETER, Specific Gravity Scale, for heavy liquids, medium grade, graduated from 1.000 to 2.000 in 0.01 divisions. Length, about 11 inches**50
7651. **HYDROMETERS, Specific Gravity Scale, for light liquids, highest quality, graduated in 0.002 divisions. Length, about 11 inches.**
- | No. | A | B | C | D |
|--------------|-------------|-------------|-------------|-------------|
| Range, | 0.600-0.700 | 0.700-0.800 | 0.800-0.900 | 0.900-1.000 |
| Each | 2.75 | 2.50 | 2.50 | 2.50 |
7652. **HYDROMETERS, Specific Gravity Scale, for light liquids, medium grade, graduated in 0.002 divisions. Length, about 11 inches.**
- | No. | A | B | C | D |
|---------------------|-------------|-------------|-------------|-------------|
| Range, gravity..... | 0.600-0.700 | 0.700-0.800 | 0.800-0.900 | 0.900-1.000 |
| Each | .75 | .75 | .75 | .75 |
7654. **HYDROMETER, Special Gravity Scale, for light liquids, medium grade, graduated from 0.700-1.000 in 0.005 divisions. Length, about 11 inches**50
7658. **HYDROMETER, Combined Baumé and Specific Gravity Scales, for heavy liquids, ordinary grade, graduated from 0° to 70° Baumé in 1° divisions, and from 1.000 to 2.000 specific gravity in 0.01 divisions. Length, about 11 inches**..... .45
7660. **HYDROMETER, Combined Baumé and Specific Gravity Scales, for light liquids, ordinary grade, graduated from 100° to 10° Baumé in 1° divisions, and from 0.600 to 1.000 specific gravity in 0.005 divisions. Length, about 11 inches**..... .45
7664. **HYDROMETER, Universal, Combined Baumé and Specific Gravity Scales for light and heavy liquids, medium grade, graduated from 100° to 10° and 0° to 70° Baumé in 1° divisions; from 0.700 to 1.000 in 0.005 divisions, and 1.000 to 2.000 in 0.01 divisions. Length, about 15 inches** 1.25

HYDROMETERS FOR SPECIAL USES

HYDROMETERS, Acid, see Hydrometers, Baumé.

7670. **HYDROMETER, Acid, Specific Gravity Scale, medium grade, for use in Babcock Milk test. Graduated from 1.800 to 1.850 in 0.001 divisions. Length, 6 inches**..... .70
7672. **HYDROMETER, Actinometer Scale, ordinary grade, for photographic uses, graduated 0° to 80° in 1° divisions. Length, 5 inches. Complete with test jar in wooden case**..... .35
7674. **HYDROMETERS, Alcohol or Spirit, United States Internal Revenue, Per Cent. of Proof Scale, highest quality. Length, about 8¾ inches.**
- | No. | A | B | C | D | E |
|----------------------------|-------|--------|---------|---------|---------|
| Range, degrees | 0-100 | 80-120 | 100-140 | 130-170 | 160-200 |
| Graduated in, degrees..... | 1 | ½ | ½ | ½ | ½ |
| Each | 2.25 | 2.25 | 2.25 | 2.25 | 2.25 |
7676. **HYDROMETER, Alcohol or Spirit, Per Cent. by Volume (Tralle) Scale, highest quality. Widely used in determining percentage of alcohol in beer according to the requirements of the Federal government. Graduated from 0° to 5° in ¼° divisions. Length, 8½ inches**..... 5.00
7678. **HYDROMETER, Alcohol, Proof and Tralle Scales, medium grade, graduated from 100° below to 100° above Proof, and from 0° to 100° Tralle in 1° divisions. Length, about 11 inches** .50
7680. **HYDROMETER, Alcohol, United States Custom House, Proof and Tralle Scales, medium grade, with enclosed thermometer. Graduations same as No. 7678. Length, about 18 inches. With correction scale**..... 3.00
7684. **HYDROMETER, Alkali, Baumé Scale, medium grade, graduated from 0° to 60° in 1° divisions. Length, about 11 inches**..... .50
7686. **HYDROMETER, Ammonia, Baumé Scale, medium grade, graduated from 10° to 50° in ½° divisions. Length, about 11 inches**..... .50
- HYDROMETER, Asphalt, see Nos. 379 and 380.**
7690. **HYDROMETER, Barkometer Scale, for tanning liquids, highest quality, with enclosed thermometer, graduated from 0° to 70° (1.000 to 1.070 specific gravity) in 1° divisions. Length, 13 inches** 5.80
7692. **HYDROMETER, Barkometer Scale, for tanning liquids, medium grade, graduated from 0° to 65° (1.000 to 1.065 specific gravity) in 1° divisions. Length, about 11 inches**..... .50



No. 7698.



No. 7730.

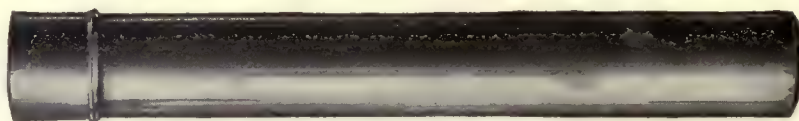


No. 7732.



No. 7738.

7696. **HYDROMETER, Battery, Specific Gravity Scale, medium grade, flat body, graduated from 1.050 to 1.300 in 0.005 divisions. Length, 7 inches** \$0.90
7698. **HYDROMETER, Battery Syringe or Chargometer, Specific Gravity Scale, ordinary grade, graduated from 1.1 to 1.3 in 0.005 divisions. Length of hydrometer, 3½ inches; length over all, 11½ inches. Complete with good quality rubber bulb and glass syringe with unbreakable flexible rubber tip.**..... 1.00
7699. **HYDROMETER only for No. 7698. Length, 3½ inches.**..... .45
7702. **HYDROMETER, Beer, Balling Scale, highest quality with enclosed thermometer, graduated from 0° to 24° in ¼° divisions. Length, about 17 inches.**..... 5.80
- HYDROMETER, Benzine, see Hydrometer, Gasoline.**
7704. **HYDROMETER, Calcium Chloride Salometer, highest quality, for specific gravity of brine. Graduated from 0° to 120° in 1° divisions. Length, about 11 inches.**..... 1.65
- HYDROMETERS, Condensed Milk, see Nos. 7744 and 7746.**
7708. **HYDROMETERS, Creosote, Specific Gravity Scale, highest quality, according to the specifications of the American Society for Testing Materials. Graduated to read at 15.5°C. in 0.001 divisions. Length, 9 inches.**
- | No. | A | B |
|----------------------|-------------|-------------|
| Range, gravity | 1.000-1.080 | 1.070-1.150 |
| Each | 3.65 | 3.65 |
- 7651B. **HYDROMETER, Ether, Specific Gravity Scale, highest quality, graduated from 0.700 to 0.800 in 0.002 divisions. Length, about 11 inches** 2.50
7714. **HYDROMETER, Gasoline, Baumé Scale, medium grade, graduated from 40° to 90° in 1° divisions. Length, about 11 inches.**..... .50
7716. **HYDROMETER, Gasoline, Baumé Scale, medium grade, graduated from 40° to 90° in 1° divisions. Length, 5 inches. Complete with test jar in wooden case.**..... .50
- For other **GASOLINE HYDROMETERS**, see Hydrometers, Oil.
7720. **HYDROMETER, Glue, Baumé Scale, highest quality, graduated from 0° to 35° in ½° divisions, for use at 150°F. Length, about 11 inches** 1.65
7724. **HYDROMETER, Lime Sulphur (Li-Sul-Sprayometer), Baumé and Specific Gravity Scales, medium grade, New York and Pennsylvania pattern, for testing lime-sulphur wash used in spraying. Graduated from 0° to 38° Baumé, in ½° divisions, and from 1.000 to 1.350 specific gravity in 0.005 divisions.**..... .75
7726. **HYDROMETER, Lime Sulphur, same as No. 7724, complete with 12x2-inch glass jar in wooden case with directions for use.**..... 1.00
7730. **HYDROMETER, Milk, Lactometer Scale, ordinary grade, graduated from 0° to 120° in 2° divisions. Length, about 11 inches.**..... .40
7732. **HYDROMETER, Milk, Quevenne's Lactodensimeter, medium grade, with enclosed thermometer, graduated from 14° to 42° (1.014 to 1.042 specific gravity) in 1° divisions. Length, about 13 inches** 3.50
7734. **HYDROMETER, Milk, Quevenne's Lactodensimeter, same as No. 7732, but without enclosed thermometer**60
7736. **HYDROMETER, Milk, Spence's Lactometer, New York State Dairy Commission Pattern, highest quality, with enclosed thermometer, graduated from 0° to 120° in 2° divisions. Length, about 12 inches. With correction scale and certificate** 5.80
7738. **HYDROMETER, Milk, Spence's Lactometer, New York State Dairy Commission Pattern, medium grade, with enclosed thermometer, graduated from 0° to 120° in 2° divisions. Length, about 12 inches. With correction scale.**..... 3.50
7740. **HYDROMETER, Milk, Lactometer, United States Department of Agriculture Dairy Division Pattern, Specific Gravity Scale, highest quality, graduated from 24° to 37° (1.024 to 1.037 specific gravity) in ¼° divisions. (See Bulletin 134 of the Bureau of Animal Industry, United States Department of Agriculture, page 16.)**..... 5.00



No. 7754.

7744. **HYDROMETER, Condensed Milk, Baumé Scale, highest quality, graduated from 0° to 15° in $\frac{1}{10}$ ° divisions. Length, about 11 inches.**..... \$2.50
7746. **HYDROMETER, Condensed Milk, Specific Gravity Scale, highest quality, graduated from 1.040 to 1.080 in 0.001 divisions, for use at 142°F. Length, 9 inches.**..... 2.50
7750. **HYDROMETERS, Oil Testing, Baumé Scale, 4 ounce size, highest quality, with enclosed thermometer, with scale at bottom reading from 20° to 120°F., for use in 4 ounce sample bottles or small test jar. Length, about 7 inches. Graduated in 1° divisions to read correct gravity at 60°F.**
- | | | | | |
|---------------------------|-------|--|-------|--|
| No. | A | | B | |
| Range, degrees Baumé..... | 10-50 | | 40-90 | |
| Each | 5.00 | | 5.00 | |
7751. **HYDROMETERS, Oil Testing, Baumé Scale, 4 ounce size, same as No. 7750, but plain, without enclosed thermometer.**
- | | | | | |
|---------------------------|-------|--|-------|--|
| No. | A | | B | |
| Range, degrees Baumé..... | 10-45 | | 45-90 | |
| Each | 2.50 | | 2.50 | |
7752. **HYDROMETERS, Oil Testing, Baumé Scale, 4 ounce size, same as No. 7750, but with smaller ranges and finer divisions for very accurate readings when small samples only are available. Graduated in $\frac{1}{16}$ ° divisions.**
- | | | | | | | | | |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| No. | A | B | C | D | E | F | G | H |
| Range, degrees Baumé..... | 10-21 | 19-31 | 29-41 | 39-51 | 49-61 | 59-71 | 69-81 | 79-91 |
| Each | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 | 5.60 |
7753. **HYDROMETERS, Oil Testing, Baumé Scale, 4 ounce size, same as No. 7752, but plain, without enclosed thermometer.**
- | | | | | | | | | |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| No. | A | B | C | D | E | F | G | H |
| Range, degrees Baumé..... | 10-21 | 19-31 | 29-41 | 39-51 | 49-61 | 59-71 | 69-81 | 79-91 |
| Each | 2.35 | 2.35 | 2.35 | 2.35 | 2.35 | 2.35 | 2.35 | 2.35 |
7754. **HYDROMETER POCKET CARRYING CASE, of nickel-plated metal, for 4-ounce hydrometer. Complete with hydrometer jar and flannel cover for hydrometer.**..... .85
7756. **HYDROMETERS, Oil Testing, Baumé Scale, regular size, highest quality, with enclosed thermometer, with scale at bottom reading from 20° to 120°F., for use in 12 or 15-inch hydrometer jars. Length, about 14 inches. Graduated to read correct gravity at 60°F.**
- | | | | | | | |
|----------------------------|--------|--|---------------|--|---------------|--|
| No. | A | | B | | C | |
| Range, degrees Baumé..... | 10-100 | | 10-45 | | 45-90 | |
| Graduated to, degrees..... | 1 | | $\frac{1}{2}$ | | $\frac{1}{2}$ | |
| Each | 5.30 | | 5.00 | | 5.00 | |
7757. **HYDROMETERS, Oil Testing, Baumé Scale, regular size, same as No. 7756, but plain, without enclosed thermometer.**
- | | | | | | | |
|----------------------------|--------|--|---------------|--|---------------|--|
| No. | A | | B | | C | |
| Range, degrees Baumé..... | 10-100 | | 10-45 | | 45-90 | |
| Graduated to, degrees..... | 1 | | $\frac{1}{2}$ | | $\frac{1}{2}$ | |
| Each | 2.75 | | 2.75 | | 2.75 | |
7758. **HYDROMETERS, Oil Testing, Baumé Scale, regular size, same as No. 7756, but with smaller ranges and finer divisions for more accurate readings. Graduated in $\frac{1}{4}$ ° divisions.**
- | | | | | |
|---------------------------|-------|-------|-------|--------|
| No. | A | B | C | D |
| Range, degrees Baumé..... | 10-40 | 30-60 | 50-80 | 70-100 |
| Each | 5.60 | 5.60 | 5.60 | 5.60 |
7759. **HYDROMETERS, Oil Testing, Baumé Scale, regular size, same as No. 7758, but plain, without enclosed thermometer.**
- | | | | | |
|---------------------------|-------|-------|-------|--------|
| No. | A | B | C | D |
| Range, degrees Baumé..... | 10-40 | 30-60 | 50-80 | 70-100 |
| Each | 2.35 | 2.35 | 2.35 | 2.35 |
7760. **HYDROMETERS, Oil Testing, Baumé Scale, regular size, same as No. 7756, but with smaller ranges and very fine divisions for use when greatest accuracy is required. Graduated in $\frac{1}{40}$ ° divisions.**
- | | | | | | | | | |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| No. | A | B | C | D | E | F | G | H |
| Range, degrees Baumé..... | 10-21 | 19-31 | 29-41 | 39-51 | 49-61 | 59-71 | 69-81 | 79-91 |
| Each | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 |
7766. **HYDROMETER, Salt Salometer, highest quality, graduated from 0° to 100° in 1° divisions for use at 60°F. Length, about 11 inches.**..... 1.65
7768. **HYDROMETER, Salt Salometer, medium grade, graduated from 0° to 100° in 1° divisions. Length, about 11 inches.**..... .50
- HYDROMETER, Silver Solution, see Hydrometers, Actinometer Scale.**



No. 7796. No. 7797.

No. 7800.

No. 7808.

No. 7810.

7772. **HYDROMETERS, Sugar, Brix Scale, highest quality, graduated in $\frac{1}{10}^{\circ}$ divisions, for use at $17\frac{1}{2}^{\circ}\text{C}$. Length, about 12 inches.**

No.	A	B	C	D	E	F	G
Range, degrees Brix.....	0-6	6-12	12-18	18-24	24-30	30-36	36-42
Each	\$2.50	2.50	2.50	2.50	2.50	2.50	2.50
No.	H	J	K	L	M	N	O
Range, degrees Brix.....	42-48	48-54	54-60	60-66	66-72	72-78	78-84
Each	2.50	2.50	2.50	2.50	2.50	2.50	2.50

7774. **HYDROMETERS, Sugar, Brix Scale, medium grade, graduated in $\frac{1}{2}^{\circ}$ divisions, for use at $17\frac{1}{2}^{\circ}\text{C}$. Length, about 11 inches.**

No.	A	B	C
Range, degrees Brix.....	0-30	30-60	60-90
Each .....	.75	.75	.75

7776. **HYDROMETER, Sugar, Brix Scale, highest quality, for waste and wash water. Graduated from -5° to $+5^{\circ}$ in $\frac{1}{10}^{\circ}$ divisions, for use at $17\frac{1}{2}^{\circ}\text{C}$. Length, about 11 inches.** 2.50

7780. **HYDROMETER, Syrup, Balling Scale, highest quality, for canners and confectioners. Graduated from 0° to 70° in 1° divisions. Length, about 11 inches.** 1.65

7782. **HYDROMETER, Syrup, Baumé Scale, medium grade, graduated from 0° to 50° in 1° divisions. Length, about 11 inches.** .50

7786. **HYDROMETERS, Twaddle Scale, highest quality, graduated in $\frac{1}{2}^{\circ}$ divisions. Length, about 11 inches.**

No.	1	2	3	4	5	6
Range, degrees Twaddle.....	0-24	24-48	48-72	72-100	100-134	134-180
Each	1.65	1.65	1.65	1.65	1.65	1.65

7790. **HYDROMETER, Varnish, Baumé and Specific Gravity Scales, highest quality with enclosed thermometer, graduated from 80° to 10° Baumé in 1° divisions and from 0.666 to 1.000 in 0.005 divisions. Length, 17 inches.** 5.80

7794. **HYDROMETER, Vinegar Solidimeter, Baumé Scale, highest quality, graduated from 0° to 6° in $\frac{1}{2}^{\circ}$ divisions. Length, about 11 inches.** 1.65

HYDROMETER JARS, see Cylinders.

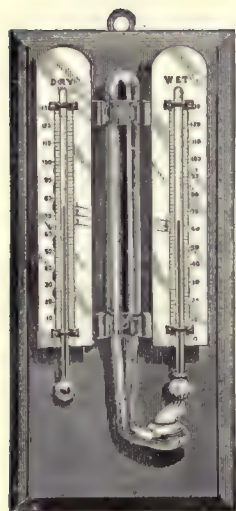
7796. **HYDROMETER, Nicholson, constant volume. Of brass, about 27 cm long over all, neatly finished** 1.50

7797. **HYDROMETER, Nicholson-Fahrenheit, constant volume. Of glass, about 12.5 cm long.** 2.00

7800. **HYDROTIMETER, Bourdon & Bourdet's, for the determination of hardness of water by means of soap solution. Consists of a burette on foot with scale of hardness marked on, sample flask for shaking graduated up to 40 cc, boiling flask with mark at 125 cc, with directions for use.** 3.60

7808. **HYGROMETER, Simple Form, for indicating approximately the amount of moisture in the air. In nickel-plated case $2\frac{1}{2}$ inches in diameter and $\frac{3}{4}$ inch deep, with beveled plate glass cover and celluloid dial graduated from 30 to 100 per cent.** 3.00

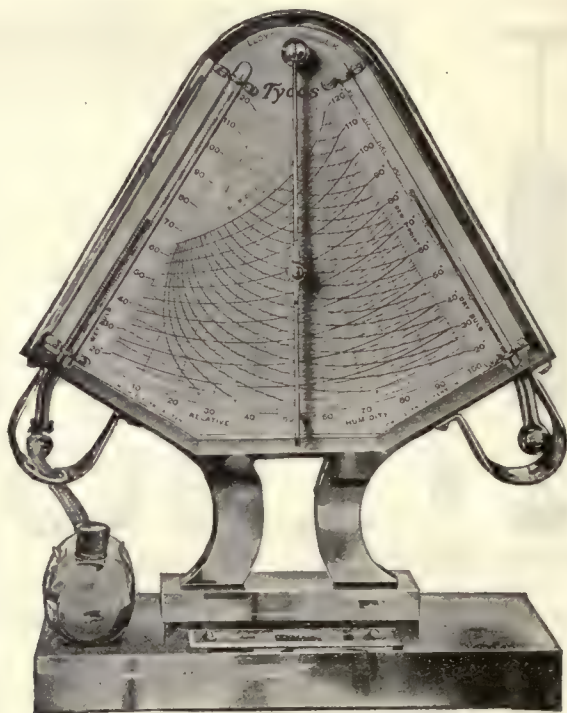
7810. **HYGROMETER, Hair. Scale denotes the humidity of the air without reference to tables. In brass case, 3 inch dial.** \$7.50



No. 7814.



No. 7826.



No. 7832.

7814. **HYGROMETER, Mason**, for determining humidity and dewpoint. Metal scale thermometer of approximate range from 10° to 120°F., mounted with insulating support on a mahogany finish board 8½x4½ inches. Glass cistern and special wick, with complete humidity tables... \$5.50
7815. **CISTERN** only for No. 7814..... .65
7816. **THERMOMETER, Dry Bulb**, for No. 7814..... 2.00
7817. **THERMOMETER, Wet Bulb**, for No. 7814..... 2.00
7820. **HYGROMETER, Mason**, simpler form than No. 7814. Thermometers not raised, mounted on oak board 8½x4½ inches. With complete humidity tables 3.00
7821. **CISTERN** only for No. 7820..... .65
7822. **THERMOMETER, Dry Bulb**, for No. 7820..... .90
7823. **THERMOMETER, Wet Bulb**, for No. 7820..... .90
7826. **HYGROMETER, Standard**, consisting of two Standard Thermometers (like No. 13720) mounted on a finely polished hardwood back 17x5 inches, metal cistern with wick, and certificate for each thermometer..... \$13.50
7827. **THERMOMETER, Dry Bulb**, for No. 7826..... 5.50
7828. **THERMOMETER, Wet Bulb**, for No. 7826..... 5.50
7832. **HYGROMETER (Hygrodeik)**, an improved form of the Mason Hygrometer. Consists of two thermometers, wet and dry bulbs, mounted upon the outer edge of a chart which has been plotted from new and corrected tables prepared under the direction of the U. S. Weather Bureau. This chart, while complicated in appearance, is very simple and obviates entirely the use of tables for temperatures between 20 and 120 degrees Fahrenheit. Size of instrument 10x7¾x3 inches. Full directions furnished with each instrument..... 13.50
7833. **THERMOMETER, Dry Bulb**, for No. 7832..... 3.50
7834. **THERMOMETER, Wet Bulb**, for No. 7832..... 3.50
7838. **HYGROMETER (Hygrodeik)**, same as No. 7832, but with chart on German silver, reading from 80° to 180°F..... 15.00
7839. **THERMOMETER, Dry Bulb**, for No. 7838..... 3.50
7840. **THERMOMETER, Wet Bulb**, for No. 7838..... 3.50
7341. **CISTERN** only for Nos. 7832 and 7838..... .80



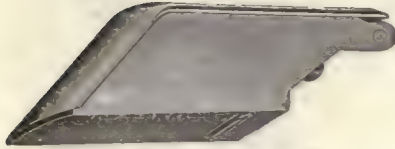
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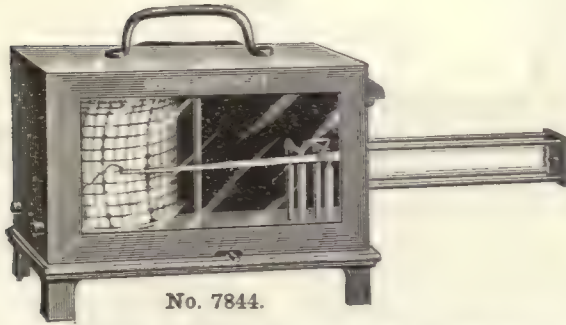
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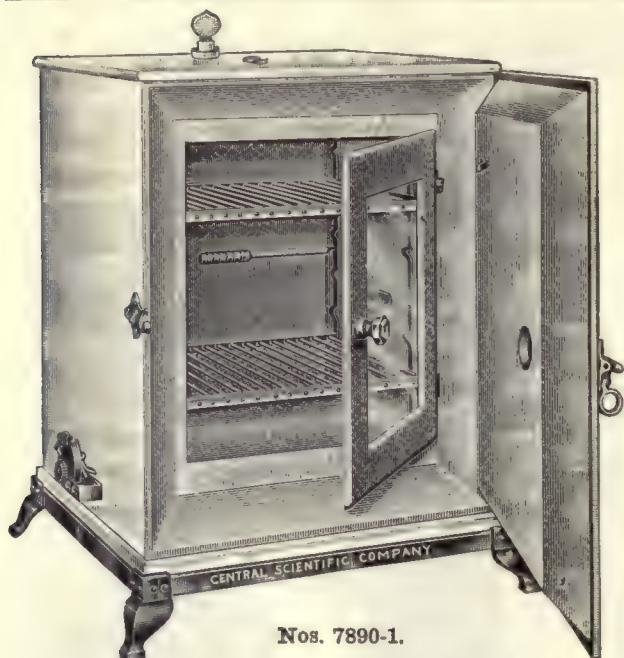


No. 7876.



No. 7878.

7844. **HYGROMETER, Registering (Hygrograph)**, for furnishing continuous record of humidity over a period of 24 hours. Complete with charts for one year..... \$60.00
7845. **CHARTS** for No. 7844..... Per box of 55 2.50
7848. **HYGROMETER, Sling Psychrometer**, designed for the purpose of obtaining quicker and more accurate results than are possible with the stationary wet and dry bulb instruments. Two special thermometers, carefully selected, are mounted on a nicely finished metal plate provided with a wooden handle and swivel, and a ring for suspending the instrument when not in use. Approximate range 0° to 100°F. in 1° divisions. 6.00
7849. **THERMOMETERS** only of No. 7848..... Each 1.60
7852. **HYGROMETER, Sling Psychrometer, Standard Grade**. Similar to No. 7848, but with thermometers of highest grade, graduated in half degree divisions, and with a copper protecting case 16¾ inches long..... 11.00
7853. **THERMOMETERS** only of No. 7852..... Each 3.50
7856. **HYGROMETER, Sling Psychrometer, Pocket Type, Standard Grade**. Similar to No. 7852, but 7 inches long with chain sling and 5-inch thermometer graduated in 1° divisions. Complete with leather carrying case..... 13.50
7857. **THERMOMETERS** only of No. 7856..... Each 3.50
7860. **HYGROMETER WICK, Silk**, fits any of our hygrometers..... .15
7870. **ICE BAG**, of heavy canvas, 20x38 cm, for breaking ice25
7872. **ICE CHIPPER** for use in quickly chipping ice to small bits of a size convenient for laboratory purposes. Tinned iron frame, wood handle..... .75
7874. **ICE CUTTING MACHINE**. Height, 15 inches; weight, 14 pounds. Hopper, 4½x6 inches by about 4 inches deep. A compact, simple and strong machine which cuts ice into small diamond shaped pieces with ease and rapidity..... \$9.50
7876. **ICE CUTTING MACHINE**, with blades which cut the ice into pieces about the size of a pea. Size of opening, 4x6 inches; height, 18 inches; space occupied, 9½x9½ inches; weight, 30 pounds 13.00
7878. **ICE CUTTING MACHINE**, similar to No. 7876, but of larger size, for floor use. Size of opening, 8½x12 inches; height, 43½ inches; floor space occupied, 24x17½ inches; capacity, 75 to 125 pounds of ice per minute; weight, 280 pounds 49.00
7880. **ICE SHAVER** for shaving ice, coarse or fine, as may be desired; of tinned iron with removable steel cutter60
- IGNITION TUBES**, see Combustion Tubes; Tubes.



Nos. 7890-1.

DeKhotinsky Bimetallic Thermo-Regulator.
(Patent Applied for.)

INCUBATORS, ELECTRICALLY HEATED AND REGULATED

INCUBATORS, Triple Wall, DeKhotinsky Electrically Heated and Regulated (Patented), with new bimetallic regulator and new system of ventilation providing for greatest possible uniformity of temperature throughout the incubator chamber.

Construction: These incubators are constructed of asbestos board on a steel frame, with three walls. The space between the two outer walls is packed with magnesia-asbestos (magnesia 85 per cent; asbestos 15 per cent). Between the inner walls is an air space, through which the air passes upward from the heating units in the base. Ports are provided in the inside walls of this air space, permitting the entrance of the heated air to the incubator chamber, in which it passes up and out through an opening in the false top. The location of these ports has been carefully and scientifically determined so as to provide a continuous current of heated air to every corner of the inner chamber making the temperature uniform throughout. This feature (patent pending) is peculiar to the DeKhotinsky Triple Wall Incubator, and insures a uniformity not possible in electrically heated incubators of any other type. The outer door is double walled and packed with magnesia-asbestos. It is beveled on the edges, making close contact, when closed, with the walls, thus preventing leakage of heat. An inner glass door is provided for inspection of the interior without cooling the contents. Between it and the outer door is a dead air space for insulation purposes.

Heating of the incubator is effected by means of four of our standard heating units of Chromel wire wound on lavite. These heating units are located in the base of the incubator between the two bottoms, with an iron deflector placed over them to prevent radiation of heat from the units into the inner chamber. Three of these heating units are connected in parallel to the switch contact springs, and may be added to the circuit one at a time as desired. The fourth is connected in circuit with the contact points of the thermo-regulator. These heating units can be easily and quickly replaced from outside the incubator without the necessity of opening the door or stopping the operation.

Temperature control of the incubator is secured by means of our new bimetallic thermo-regulator which is made from invar-brass ribbon, and can be set at any desired temperature from that of the surrounding air up to the maximum heat capacity of the incubator. This range of temperature permits the use of these instruments as incubators, paraffine baths, drying ovens or sterilizers. The precision of action of this thermo-regulator is $\frac{1}{4}^{\circ}\text{C}$. The make-and-break contact of the thermo-regulator is located outside the incubator, to prevent the possibility of ignition of inflammable gases, developed in the inner chamber when used as a drying oven, which often occurs when the contact is made and broken inside. A pilot lamp on top of the incubator is connected in series with the thermo-regulator, enabling the operator to determine at a glance whether the incubator is regulating. These instruments can be operated on either A.C. or D.C. circuits. Complete with Hubbell receptacle and five feet of flexible asbestos covered cord with separable Hubbell attachment plug.

No.	A	B	C
Height inside, inches.....	10 $\frac{5}{8}$	14 $\frac{3}{4}$	19 $\frac{3}{4}$
Width inside, inches.....	7	12	17
Depth inside, inches.....	6 $\frac{1}{2}$	11 $\frac{3}{4}$	14
Shelf space, square inches.....	91	282	476
For 110 volts.....	\$55.00	90.00	145.00
For 220 volts.....	57.50	92.50	147.50

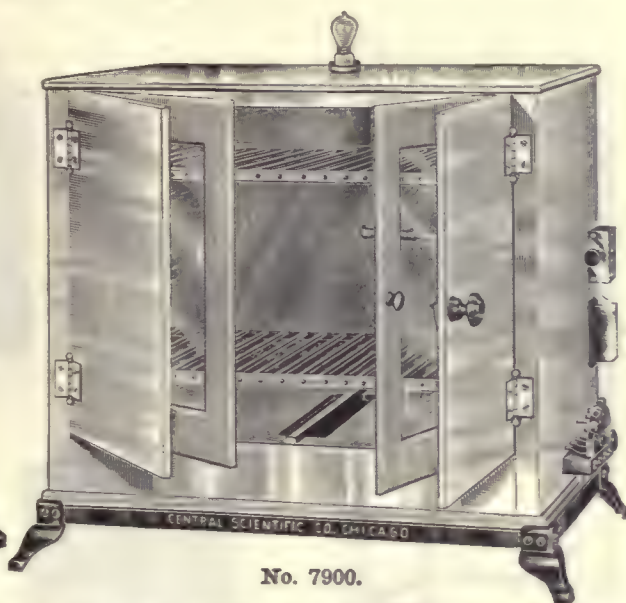
7890.

7891.

For **EXTRA HEATING UNITS** for Nos. 7890-1, see Nos. 7526-7.



No. 7898.



No. 7900.

7898. **INCUBATORS, Single Wall, DeKhotinsky Electrically Heated and Regulated (Patented), with new bimetallic thermo-regulator.**

Construction: The incubator is built of $\frac{1}{4}$ -inch asbestos board on a steel frame with a foundation of $\frac{3}{8}$ -inch asbestos board. To effect the greatest uniformity of temperature possible in an incubator of the single wall type, the heating units are placed between two bottoms, the upper bottom being protected from the direct heat of the units by an iron deflector. Air heated by the units passes back between the bottoms, up through the space between the double back to the upper part of the incubator, and after circulating through the chamber returns to the inter-bottom space by way of an opening in the front part of the false bottom. Two shelves of the grid type are provided which, by means of racks, may be set at any desired height. An inner glass door permits inspection of the interior without cooling the contents. The incubator is mounted on a japanned steel base.

Heating of the incubator is effected by means of four of our standard heating units of 115 watts each, three of which are permanently connected to the switch contact springs, and the remaining one—the heat regulating unit—is in circuit with our bimetallic thermo-regulator for automatic control of the desired temperature. The system is fused for protection.

Temperature control is effected by means of our new bimetallic thermo-regulator, which is made from invar-brass ribbon, and can be set at any desired temperature from that of the surrounding atmosphere to the maximum heat capacity of the incubator, about 95°C. This range of temperature permits the use of these instruments as incubators, paraffine baths, or inactivation chambers. The precision of action of this thermo-regulator is $\frac{1}{4}$ °C. The make-and-break contact of the thermo-regulator is located outside the incubator, to prevent the possibility of ignition of inflammable gases developed in the inner chamber when used as a paraffine oven, which often occurs when the contact is made and broken inside. A pilot lamp on top of the incubator is connected in series with the thermo-regulator, enabling the operator to determine at a glance whether the incubator is regulating. These incubators can be operated on either A.C. or D.C. circuits. Complete with two extra cartridge fuses, Hubbell receptacle, and 5 feet of flexible asbestos covered cord with separable Hubbell attachment plug.

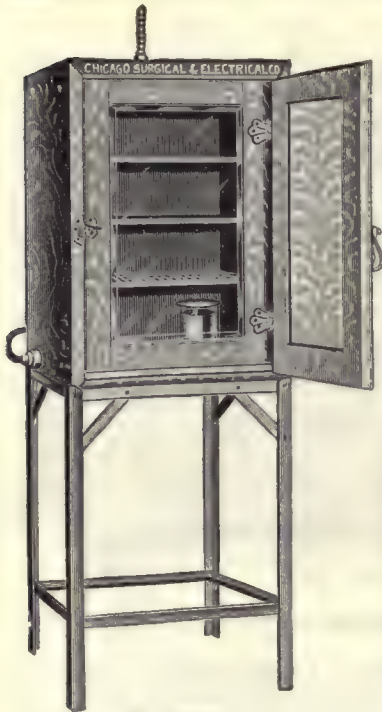
No.	A	B
Height inside, inches.....	12	12
Width inside, inches.....	11	11
Depth inside, inches.....	9	9
Shelf space, square inches.....	220	220
For volts.....	110	220
Each	\$50.00	52.50

7900. **INCUBATORS, Single Wall, DeKhotinsky Electrically Heated and Regulated, of same construction as No. 7898, but larger, with two doors and with eight 115-watt heating units. With same equipment as No. 7898.**

No.	A	B
Height inside, inches.....	14	14
Width inside, inches.....	18	18
Depth inside, inches.....	12	12
Shelf space, square inches.....	430	430
For volts.....	110	220
Each	70.00	72.50

For **EXTRA HEATING UNITS** for Nos. 7898-7900, see Nos. 7526-7.

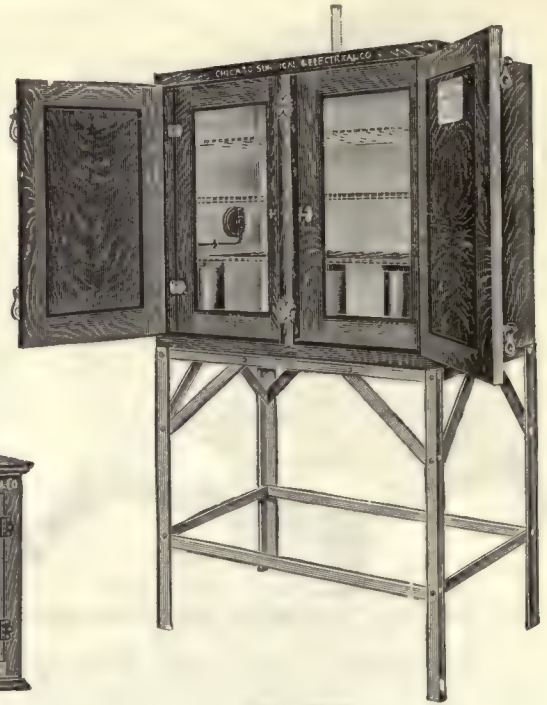
For **EXTRA FUSES** for Nos. 7898-7900, see No. 9850.



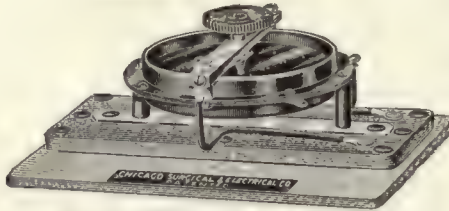
No. 7908.
Size No. 41.



No. 7908.
Size No. 1.



No. 7908.
Size No. 33.



Electro-Thermostat of No. 7908.

INCUBATORS, Electric, Wood Frame, with electro-thermostatic control.

Construction: The walls are constructed of successive layers of transite, tar paper, animal hair, tar paper and five-ply wood, the latter consisting of quarter sawed oak over fibrous chestnut. The No. 1 Incubator, because of its small size, is sheathed with a solid wall of quarter-sawed oak $\frac{1}{2}$ inch in thickness. The others all have the five-ply construction. By this construction, excellent insulation is secured, without danger of warping under the influence of heat or capillary moisture from inside the incubating chamber. The doors are provided with glass for observation of the contents, except in the larger sizes (Nos. 11-41), where an inner door of glass is provided with the entire outer door made of wood. The outer wall of quarter-sawed oak is finished in the natural color and highly polished.

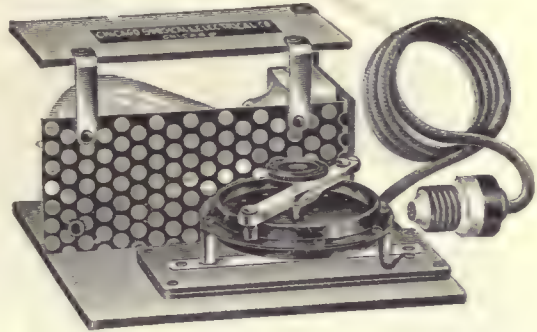
Heating is accomplished by means of incandescence carbon filament lamps, which heat quickly and cool quickly. The sizes of these are selected according to the cubic contents to be heated. If specified when ordered, the incubators can be furnished with wire wound electric heaters with pilot lights.

Ventilation is provided for by means of two holes in the smaller sizes, one near the bottom through which cold air enters, the other at the top through which the warm air escapes. In the larger sizes, there are four holes for entrance and escape of air, and the lamps are provided with chimneys for the purpose of creating air currents. In this manner, a constant air current is maintained.

Regulation of the temperature is effected by means of the electro-thermostat, which consists of a diaphragm of hard rubber and a metal disk riveted together. The difference in the expansion of the hard rubber and metal causes the former to become cup-shaped thus moving forward the center to which a platinum contact is attached. As the temperature is lowered the motion is reversed. By this means contact is alternately made and broken between two platinum points in circuit with the lamps, one attached to the diaphragm, the other to a thumb screw passing through the bridge across the thermostat, thus controlling the temperature. A condenser is provided by which the electric spark between the contact points is quenched, preventing the points from being quickly used up. The thermostat and condenser are mounted on a transite base.



Nos. 7912-3.



No. 7916.

INCUBATORS, Electric, Wood Frame, Continued.

Each incubator is furnished complete with 6 feet of connecting cord and plug for attachment to any lamp socket, Centigrade thermometer, and wire screen shelves.

Shipping weight,

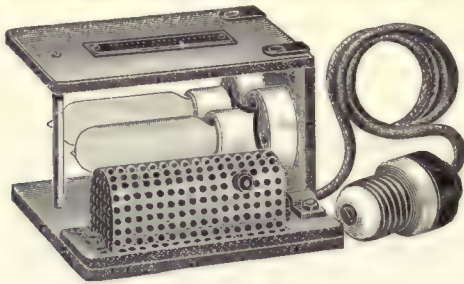
No.	1	2	3	11	12	13	31	32	33	41
Height inside, inches	9	26	12	15	50	30	30	26	30	30
Width inside, inches	7	18	9	12	18	36	20	18	36	20
Depth inside, inches	7	18	9	10½	18	18	18	18	18	18
No. of shelves..	1	1	1	1	4	3	3	1	3	3
No. of lamps..	1	2	2	2	2	3	2	2	3	2
Candle power of lamps....	8	16	8	8	16	16	16	16	16	16
Doors	single	double	single	double	double, inner one divided	double, divided in middle	double	double	double, divided in middle	double
Height of stand, inches .....	.....	.....	.....	.....	20	.....	.....	32	32	32
Shipping weight, lbs.	15	145	22	38	300	220	175	180	265	220
7908. For 110 volts..	20.00	72.50	25.00	44.00	150.00	165.00	85.00	85.00	180.00	97.50
7909. For 220 volts..	20.00	72.50	25.00	44.00	150.00	165.00	85.00	85.00	180.00	97.50

For **PARAFFINE OVENS** of same construction as No. 7908 Incubators, see **Paraffine Ovens** No. 10122.

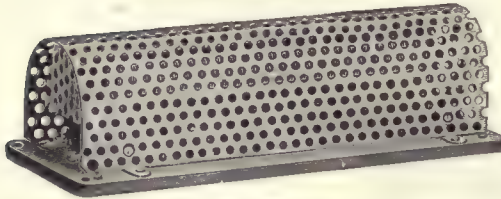
INCUBATORS, Electric Compartment, of same construction as No. 7908 but with incubating space divided into compartments, each of which is provided with a finely finished quarter-sawed oak front with drawer pull for removing. The method of heating and temperature control are the same as described under No. 7908. Ventilation and circulation of air through the various compartments are provided for by making the drawers of perforated galvanized steel, sliding on steel frames. Depth of each compartment inside, 18 inches; height, 6 inches; width, 5 inches. Each incubator is mounted on an angle-iron support of convenient height, and furnished with 6 feet of connecting cord and plug for attachment to any 110-volt lamp socket and with Centigrade thermometer. No.

	A	B	C	D
Number of drawers.....	12	24	36	48
Height outside, inches.....	42	41	48	55
Width outside, inches.....	22	42	42	54½
Depth outside, inches.....	23¼	23¼	23¼	23¼
Height of stand, inches.....	26	26	20	20
7912. For 110 volts.....	250.00	350.00	490.00	575.00
7913. For 220 volts.....	250.00	350.00	490.00	575.00

7916. **ELECTRIC HEATING DEVICE** for changing a gas heated incubator into an electric, consisting of an incandescent lamp, Electro-Thermostat No. 13756 and condenser mounted together on a transite base with cord and plug attached ready for connection to any 110-volt lamp socket. This outfit can be placed on the bottom of any incubating chamber with a capacity not exceeding 3600 cubic inches and the cord run through the hole usually found at the bottom of the incubator on the right hand side. If the incubator is water jacketed, the water should be removed to secure the best results. Space occupied by heater, 8x8x4½ inches high. Weight packed for shipment, 8 pounds. For 110 volts..... 13.75



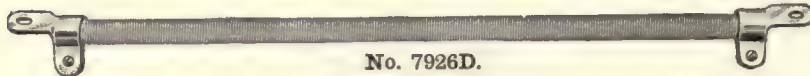
No. 7918.



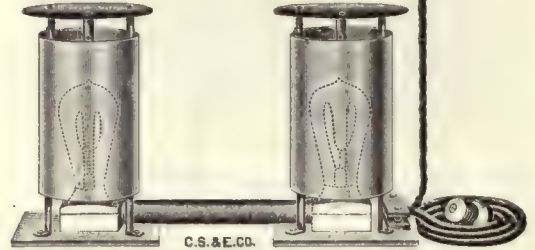
Nos. 7926A-B.



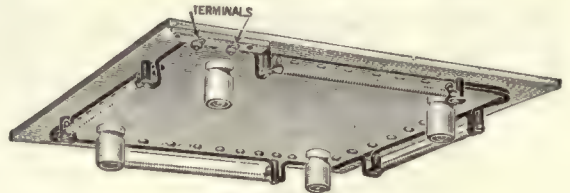
C.S. & E. CO.
No. 7926E.



No. 7926D.



C.S. & E. CO.
No. 7920.



Nos. 7922-3.

7918. **ELECTRIC HEATING DEVICE** for electrifying small incubators, similar to No. 7916, but smaller, with two special 8 candle power lamps mounted on a $\frac{3}{16}$ inch transite base with thermostat, protected from above by a shelf of transite. Method of installing is the same as for No. 7916. Height of heating device, 3 inches; length, $4\frac{1}{2}$ inches; width, 5 inches. Complete with attachment cord and plug, for 110 volts..... \$13.75

7920. **ELECTRIC HEATING DEVICE** for large incubators, consisting of two 16-candle power incandescent lamps protected by metal chimneys and Electro-Thermostat No. 13756, wired together with attachment plug and cord ready to install. The method of installing is the same as given under No. 7916. This equipment can be used successfully in incubating chambers not exceeding 8200 cubic inches in cubical space. Weight packed for shipment, 12 pounds. For 110 volts 20.00

ELECTRIC HEATING PLATES, for use in Incubators No. 7908 and 7909 in place of carbon lamps with chimneys, where a dark chamber is desired. The heater consists of a plate of transite mounted on porcelain legs, on the under side of which are mounted a sufficient number of Heating Units No. 7926D to maintain a temperature of $37\frac{1}{2}^{\circ}\text{C}$. Units are easily removable and replaceable in case of injury. A pilot lamp is mounted in the circuit.

No.	A	B	C	D	E	F	G	H	J
For incubator, No....	2	3	11	12	13	31	32	33	41
7922. For 110 volts.....	8.25	4.50	6.50	8.25	8.25	8.25	8.25	8.25	8.25
7923. For 220 volts.....	8.25	4.50	6.50	8.25	8.25	8.25	8.25	8.25	8.25

7926. **ELECTRIC HEATING STOVES and UNITS** for electrifying gas heated incubators. These are for permanent installation and should be installed and wired by an experienced electrician. They should be used with Electro-Thermostat No. 13756 for temperature control. They consist of resistance wire wound on an insulating medium, and in the case of Nos. A, B and C are mounted on transite base and protected by a perforated metal shield. No. E is intended to be used with clips, such as are used for fuses. No. D can be attached by means of binding posts. All are wound for use on 110 volts.

No.	A	B	C	D	E
Size of heater, inches..	14x5x3 $\frac{3}{4}$	9x3 $\frac{3}{4}$ x3	9x2	8x $\frac{1}{4}$	2 $\frac{5}{8}$ x3 $\frac{3}{4}$
Capacity, amperes.....	$\frac{3}{4}$ to 3	$\frac{3}{4}$ to 3	$\frac{1}{4}$	$\frac{1}{4}$	1 to 1 $\frac{1}{2}$
Recommended use.....	incubating rooms	large incubators and incubating rooms	small incubators	small and medium sized incubators	sterilizers
Each	12.00	10.00	5.00	1.00	2.25



INCUBATORS, WATER JACKETED

No. 7936F.

INCUBATORS, Triple Wall, constructed of heavy polished copper, reenforced at all points subject to strain. The outer walls are covered with a heavy waterproof insulating material bound at the edges by copper trimmings. The walls are triple in construction, forming an inner water jacket surrounded by an air space. The walls of the water jacket are reenforced to prevent bulging due to the water pressure. The outer door is double walled, with beveled edges cushioned with felt to exclude air. The inner door is of plate glass, separated by a dead air space from the outer door, permitting inspection of the contents without cooling the inner chamber. The bottom of the incubator is made conical in shape to distribute the heat and prevent it striking at one point. Two openings in the bottom together with a slide ventilator, permit the control of the heated air. The interiors are furnished with woven wire trays with edges bound with copper, supported by brackets riveted to the sides.

Circulation of air is provided for in the incubating chamber by means of a long pipe which runs through the water space, thus preheating the air. The thorough insulation of the incubating chamber by means of a water jacket, an air space and a non-conductive outer covering, makes precise regulations of the temperature an easy matter, whether the heat is furnished by gas, oil or the electric current. All incubators are supplied with sheet iron bases to protect from drafts, the doors of which have mica windows through which the flame may be observed. Tubulations are provided for thermometer, thermo-regulator, ventilation and filling. A gage glass, open at the top, indicates the amount in the water jacket. A stop-cock enables the water to be cut off from the glass in case it is broken, and a faucet is attached for draining the jacket. Incubators may be obtained without any equipment for heating or regulation by those who already possess such apparatus.

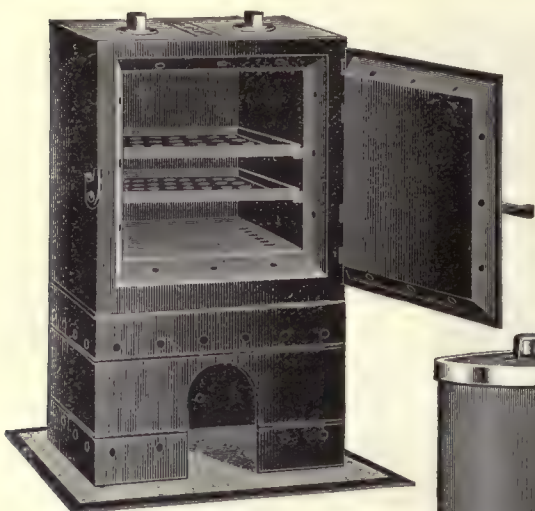
For gas heating, a Koch safety burner is provided with six feet of metallic tubing, an incubator thermometer and a Reichert thermo-regulator, which is connected by a metal tube passing through the air jacket to the burner. The Koch Safety Burner will automatically cut off the gas supply within 15 seconds after the flame is extinguished.

For oil heating, an oil lamp is supplied, together with a thermo-regulator which operates a damper controlling the escape of the heat or its admission to the incubator. A thermometer is also furnished.

For electric heating, replaceable heating units are furnished together with a thermo-regulator, relay, incubator thermometer and connecting cord and plug for attachment to any lamp socket. Either of the above methods of heating and temperature control will maintain a constancy of $\frac{1}{2}^{\circ}\text{C.}$ within the incubating space. These incubators can also be used satisfactorily as paraffine ovens.

	No.	A	B	C	D	E	F	G
	Height inside, inches.....	9 $\frac{1}{2}$	19	18	19	19	25	28
	Width inside, inches.....	12	18	30	12	18	30	18
	Depth inside, inches.....	9 $\frac{1}{2}$	14	14	9 $\frac{1}{2}$	9 $\frac{1}{2}$	18	14
	Height of base, inches.....	15	15	30	15	15	30	30
	Number of doors.....	1	1	2	1	1	2	1
7936.	Without heating equipment..	\$ 69.50	141.25	209.75	105.00	121.00	245.00	182.00
7937.	With gas heating equipment..	84.50	179.75	248.25	120.00	143.00	283.55	220.25
7938.	With oil heating equipment..	106.50	178.25	248.25	142.00	158.00	283.50	220.50
7939.	With electric heating equipment	101.00	204.00	274.00	158.00	179.75	313.50	249.25

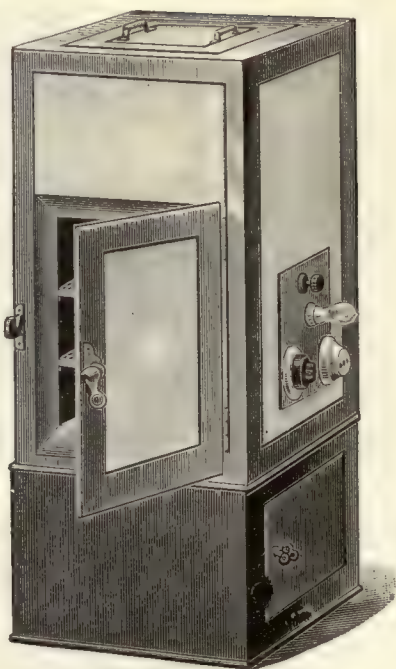
In ordering No. 7939, kindly state voltage and nature of current.



No. 7946.

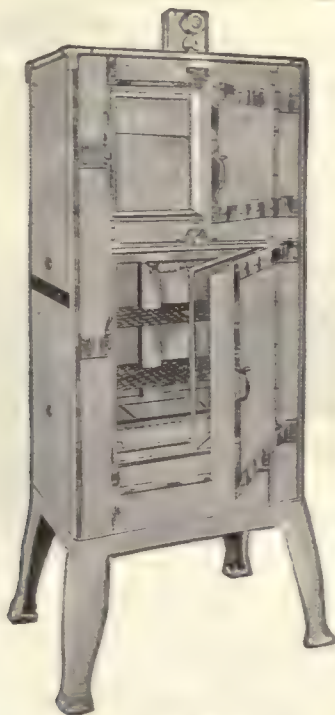


No. 7950.



No. 7960.

INCUBATORS, Double Wall , similar in construction to No. 7936, but without air space around the water jacket. With sheet iron base 9 inches high with opening on the side for burner, and with one shelf. Can be used satisfactorily as a paraffine oven.			
No.	A	B	
Height inside, inches.....	10	12	
Width inside, inches.....	8	10	
Depth inside, inches.....	8	10	
7946. Without heating equipment.....	\$51.00	69.50	
7947. With gas heating equipment.....	65.00	84.50	
INCUBATOR, Double Wall, round form , for use where only a small number of cultures is handled at a time. Made of polished copper with a 2-inch water jacket, covered with an insulating material. Two covers are provided, the inner one of glass to permit inspection of the contents. With water gage, stop-cock for draining and perforated tray, mounted on sheet iron base 9 inches high with opening for Bunsen burner.			
Height inside, 9 inches.	Height outside, 12 inches.		
Diameter inside, 8 inches.	Diameter outside, 12 inches.		
7950. Without heating equipment.....		22.00	
7951. With gas heating equipment.....		30.00	
7960. INCUBATORS, Low Temperature, Electrically Controlled , for gelatine cultures at 20°C., or for use at any other predetermined temperature. Constructed entirely of copper and asbestos board, with no wood casing to warp or decay. The walls are thoroughly insulated to prevent the passage of heat. No running water is used. The internal arrangement provides for a perfect circulation of air and consequent uniformity of temperature throughout the incubating chamber. Equipped with electric thermo-regulator with pilot lamp.			
Height outside, 28 inches.	Height inside, 14 inches.		
Width outside, 14¾ inches.	Width inside, 12 inches.		
Depth outside, 16¼ inches.	Depth inside, 12 inches.		
Height of base, 12 inches.			
Complete with 6 feet of connecting cord and plug for attaching to lamp socket. Can be used on either A. C. or D. C. circuit.			
No.	A	B	
For volts.....	110	220	
Each	225.00	225.00	



No. 7964.



No. 7974.

7964. **INCUBATORS, Low Temperature, Thelco, Electrically Controlled**, with walls composed of ten distinct layers of wood, porcelain, impervious sheeting, dead air spaces and wool felt. The outside covering is of porcelain, fused on steel, with aluminum trimmings around the doors, edges and corner. The Incubator contains two chambers, an upper for ice and a lower for the water-jacketed working compartment, each with its own outside door. The ice chamber is one-piece porcelain lined, and is equipped with a heavy galvanized ice rack. The capacity of this chamber is about 75 pounds of ice, which will last several days in a warm laboratory. The electric heating element, or plate, covers the bottom of the lower chamber and is removable. This heating element is made of asbestos transite, wound with a special resistance wire and can be depended upon to run indefinitely without attention. The working compartment is placed within the lower chamber directly on the heating element. It is a heavy triple-walled copper jacket, the space between the walls filled with water, and the arrangement is such that while in use the water is in constant circulation. A constant water level attachment is placed on the outside of the incubator so that water in the walls of the copper jacket is automatically kept at a constant level.

The bimetallic thermostat is located in the top of the working compartment and is regulated by means of a milled head screw from the outside. A pilot lamp indicates when contact is made and broken. The thermostat can be quickly and easily set to give any desired temperature between 10°C. and 40°C.

The working compartment is provided with a cushioned glass door to allow inspection of the contents of the chamber without exposure to the warm outer air. Complete with two adjustable shelves, adjustable ventilator, snap switch, and connecting cord and plug.

No.	A	B
For volts.....	110	220
Each	\$330.00	330.00

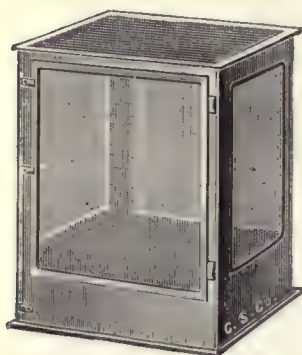
7974. **INCUBATOR, Opsonic**, for maintaining pipettes of blood serum at a temperature of 37°C. Constructed of heavy polished copper with tubulations for thermometer, gas regulator and for filling the bath, and with receptacles for 20 pipettes, numbered in order. A cup 3½ by 1 inch is provided for holding instruments. Mounted on a sheet iron base, 8 inches high, with opening for Bunsen burner. Type A is provided also with six holes, ⅞ inch in diameter, in the top to hold test tubes. Without burner or regulator.

No.	A	B
Height, inches.....	14	14
Width, inches.....	8	8
Depth, inches.....	6	4
Each	28.50	22.50

INDUCTION COILS, see **Electrical Apparatus**.

INK, DIAMOND, see **Diamond Ink**.

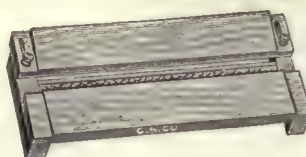
INK, Drawing, see **Drawing Ink**.



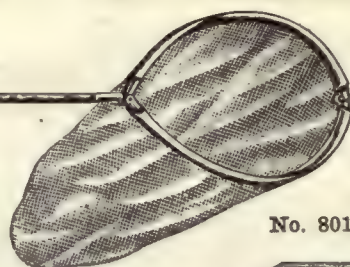
No. 8004.



Nos. 8040-2.



No. 8026.



No. 8012.



No. 8000.

No. 7984.

No. 7990.

7984. **INOCULATING NEEDLE**, a platinum needle 40 mm long, of No. 28 wire, set in a glass handle \$0.80
7986. **INOCULATING NEEDLE**, same as No. 7984, but with 80 mm of No. 27 wire..... 1.80
7990. **NEEDLE HOLDER**, inoculating, of brass, nickel-plated, with screw chuck for holding platinum or nichrome wire from No. 28 to No. 24 inclusive. Length, 160 mm. Without wire.. .25
- PLATINUM WIRE** for No. 7990, see general heading **Platinum Ware**.
8000. **INSECT BREEDING CAGE**, of zinc, glass front, with top, bottom and sides of wire gauze for ventilation. Top and bottom are removable. Size $5\frac{1}{2} \times 5\frac{1}{2} \times 10$ inches high..... 4.00
8001. **TRAY** of galvanized iron, water tight, for use with No. 8000 Insect Breeding Cage for aquatic insects50
8004. **INSECT BREEDING CAGE**, all metal, non-corrosive, folding, easily adjusted. Top and sides of wire gauze for ventilation. Size $12 \times 12 \times 16$ inches high..... 5.00
8010. **INSECT NET**, with collapsible steel frame $13\frac{1}{2} \times 11\frac{1}{4}$ inches when open, and one piece bamboo handle 30 inches long..... 2.50
8012. **INSECT NET**, similar to No. 8010, but with steel frame measuring 15×14 inches when open and with two-piece jointed handle 48 inches long..... 3.50
8018. **INSECT PINS, black**, with round yellow heads; very stiff with sharp points, in packages of
- | | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|
| No. | 00 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Per 100 | .25 | .25 | .22 | .22 | .22 | .22 | .22 | .22 |
| Per 1000 | 2.00 | 2.00 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 |
8020. **INSECT PINS, white**, with round heads, in packages of 100.
- | | | | | | | | |
|----------|------|------|------|------|------|------|------|
| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Per 100 | .25 | .25 | .25 | .25 | .25 | .25 | .25 |
| Per 1000 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
8026. **INSECT SPREADING BOARDS**, for use in drying insects preparatory to mounting. Consists of two strips of hardwood cleated together leaving a groove in the middle in which the body of the insect is placed while the wings are pinned to the two strips.
- | | | | |
|----------------|----------------|-----------------|-----------------|
| No. | A | B | C |
| Length, inches | 12 | $12\frac{3}{8}$ | $16\frac{1}{2}$ |
| Width, inches | $4\frac{7}{8}$ | $3\frac{3}{8}$ | $7\frac{7}{8}$ |
| Each | 1.10 | 1.30 | 1.50 |

INTERVAL TIMER, see Clock, Interval.

JARS, ALL KINDS

JARS, Anaerobic Culture, see Anaerobic Culture Apparatus.

JARS, Animal, see Animal Holders.

JARS, Aquarium, see Aquarium Jars.

8040. **JARS, Battery**, cylindrical form, of green glass.

No.	A	B	C
Diameter, inches	4	5	6
Height, inches	5	7	8
Capacity, quarts	1	2	4
Each	.20	.25	.40

8042. **JARS, Battery**, cylindrical form, of clear white glass, frequently used for aquaria and specimen work.
- | No. | A | B | C | D | E |
|-----------------------|------|------|------|------|-------|
| Diameter, mm. | 100 | 100 | 125 | 150 | 225 |
| Height, mm. | 100 | 125 | 175 | 200 | 300 |
| Approx. capacity, cc. | 1000 | 1200 | 2500 | 4000 | 14000 |
| Each | .55 | .70 | 1.05 | 1.25 | 3.10 |



No. 8046.



No. 8054.



No. 8062.



No. 8070.



No. 8071.



No. 8074.

For **BATTERY JARS** of other sizes and shapes, see general heading **Batteries**.

JARS, Bell Glass, see general heading **Bell Jars**.

JARS, Chidlow's Gas Collection, see **Flour Testing Apparatus**.

JARS, Chidlow Expansion, see **Flour Testing Apparatus**.

8046. **JARS, Dressing**, with loosely fitting knobbed cover.

No.	A	B	C	D
Height outside without lid, mm.	100	120	150	210
Diameter outside, mm.	100	115	150	190
Each	\$1.00	1.25	1.90	3.00

JARS, Hydrometer, see **Cylinders**.

JARS, Leyden, see **Catalog F of Physical Apparatus**.

JARS, Mouse, see **Animal Jars**.

8054. **JARS, Museum, or Specimen**, of clear white glass, with diameter of mouth same as that of body. With glass lid with rings for suspending specimens, rubber gasket for sealing, and metal clamp for fastening lid. Only those sizes shown in heavy type are carried in stock. Other sizes can be furnished on short notice:

No.	A	B	C	D	E	F	G	H	J	K	L	M
Height, without lid, inches	4	6	8	12	6	8	12	18	8	12	15	18
Diam. inside, inches	2 1/4	2 1/4	2 1/4	2 1/4	3 1/2	3 1/2	3 1/2	3 1/2	5	5	5	5
Capacity, pints	1/2	3/4	1	1 1/2	1 3/4	2 1/2	4	6	5 1/2	8	10	12
Each	.96	1.10	1.14	1.25	1.50	1.62	1.90	2.28	2.90	3.42	3.65	3.94
No.	N	P	Q	R	S	T	U	V	W	X	Y	Z
Height, without lid, inches	8	12	6	8	12	15	18	24	36	12	18	24
Diam. inside, inches	6 1/4	6 1/4	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	7 3/8	11 1/2	11 1/2	11 1/2
Capacity, pints	8	12	9	12	18	20	28	36	56	36	58	80
Each	3.72	4.20	5.40	5.70	6.65	7.20	7.65	8.80	11.45	13.50	17.10	21.40

8055. **LIDS** only for No. 8054.

Diameter, inches	2 1/4	3 1/2	5	6 1/4	7 3/8	11 1/2
Each	.10	.18	.35	.45	.90	2.25

8056. **RUBBER GASKETS** only for No. 8054.....each .10 .18 .62 .70 1.05 2.40

8057. **CLAMPS** only for No. 8054.....each .45 .55 .75 .95 1.55 2.90

8062. **JARS, Museum or Specimen**, of clear white glass, wide mouth, with glass stoppers carefully ground in to make air tight seal. Sizes printed in heavy type are carried in stock; other sizes will be furnished on short notice.

No.	A	B	C	D	E	F	G	H	J	K	L
Diameter of body, inches..	1½	1½	2	2	2	2½	2½	2½	3	3	3
Height to shoulder, inches..	2	3	2½	3¾	5	3½	5	7	4	6	8
Diameter of mouth, inches..	1¼	1¼	1½	1½	1½	2	2	2	2½	2½	2½
Height to top of stopper, inches	3½	4½	4½	5½	6¾	7	7	9	6¾	8¼	10¼
Capacity, ounces.....	1½	2½	3½	5	7	8	12	16	12	20	20
Each .....	.44	.47	.50	.55	.62	.65	.75	.80	.82	.94	1.10
No.	M	N	P	Q	R	S	T	U	V	W	
Diameter of body, inches.....	3¾	3¾	3¾	4½	4½	4½	6	6	6	6	
Height to shoulder, inches.....	6	8	10	5	8	12	7	10	12	15	
Diameter of mouth, inches.....	3	3	3	3½	3½	3½	5	5	5	5	
Height to top of stopper, inches..	8½	10½	12½	7¾	10¾	14¾	10	13	15	18	
Capacity, ounces	32	40	56	40	64	98	100	144	168	212	
Each	1.25	1.50	1.80	1.55	1.95	2.30	2.75	3.60	3.85	4.50	

JARS, Nessler, see **Colorimetric Apparatus**.

8070. **JARS, Percolating**, graduated in ounces.

Capacity to top mark, gallons	1/4	1/2	1	2
Each	2.00	2.90	4.40	6.50

8071. **JARS, Percolating**, same as No. 8070, but graduated in cc.

Capacity to top mark, cc.	1000	2000	4000	8000
Each	2.00	3.00	4.50	6.70

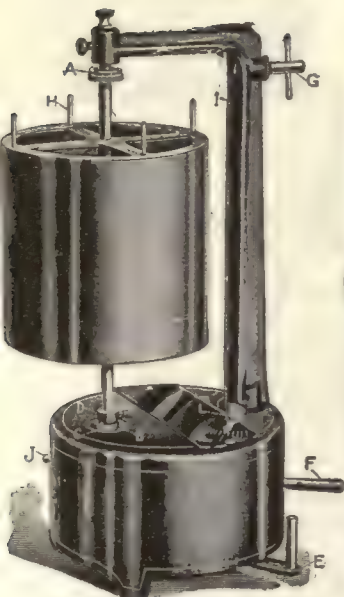
8074. **JARS, Precipitating**, of heavy glass with lip.

Capacity, pints	1/4	1/2	1	2	4	8	16	24
Each	.55	.60	.85	1.15	1.50	1.85	3.30	6.65



JARS, Preparation, with glass covers, see Dishes, Preparation.
JARS, Sample, Screw-cap, see Bottles, Sample.

8078.	JARS, Sample, glass, with metal screw cap; valuable for samples, etc.					
	Capacity, ounces.....	2	4	8		
	Per dozen.....	\$0.60	.65	1.10		
8086.	JARS, Specie, of glass with metal cover, for collecting gases, storing chemicals, etc.					
	Capacity, quarts.....	1	2	4		
	Each .....	.30	.45	.60		
• 8090.	JARS, Specimen, of glass, with knobbed cover loosely fitting. Knob is sunk to permit stacking of jars.					
	No.	A	B	C	D	E
	Height, inches.....	2½	3¾	5	6	6¾
	Diameter of top, inches.....	6¾	6¾	8½	9¾	10¾
	Diameter of bottom, inches.....	5¾	5¾	7½	8¾	9¾
	Capacity, pints.....	2	3	6	9	13
	Each .....	.40	.50	1.20	1.50	2.50
8092.	JARS, Specimen, of glass, with glass cover provided with rubber ring for sealing.					
	No.	A	B	C	D	
	Height outside, inches.....	5¾	7¼	8½	11	
	Diameter of mouth, inches.....	3½	4½	5½	7½	
	Capacity, quarts.....	1	2	4	8	
	Each .....	.30	.50	.80	2.00	
8094.	JARS, Specimen, of clear glass with cover, clamping device and rubber gasket.					
	No.	A	B	C	D	E
	Height, inches.....	2½	3½	3¾	5½	4¾
	Diameter, inches.....	2¾	3	3½	3½	4¼
	Capacity, ounces.....	4¾	8	9	14	23
	Each .....	.15	.20	.25	.30	.35
8096.	JARS, Specimen, Calcutt's, made entirely of glass, so there is no danger of corrosion. A half turn of the cover renders the jar air tight.					
	Capacity, pints.....				1	2
	Each .....				.19	.39
	Per dozen.....				1.90	3.90
	JARS, Specimen, Inverted Show, see Bottles, Inverted Show.					
8098.	JARS, Specimen, Mason's Fruit, with screw-lids and rubber gaskets for sealing.					
	Size, quarts			½	1	2
	Each .....			.07½	.08	.11
	Per dozen .....			.75	.80	1.10
8100.	JARS, Specimen, Sure Seal, with glass cover, metal clamping device and rubber gaskets.					
	Size, quarts			½	1	
	Each .....			.15	.15	.16
	Per dozen			1.50	1.50	1.60
8104.	JARS, Staining, Coplin's, for ten 3x1-inch slides, with glass lid.....				each	.45
					per dozen	4.50
8106.	JAR, Staining, Naples, of clear glass, with loosely fitting hemispherical cover. Height, 90 mm; diameter, 35 mm.....					.75
8108.	JAR, Staining, Naples, same as No. 8106, but with cork stopper, without glass cover..					.65



No. F6065.



No. 8112.



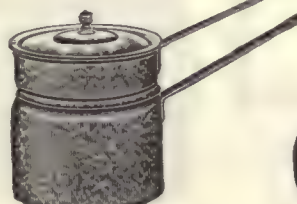
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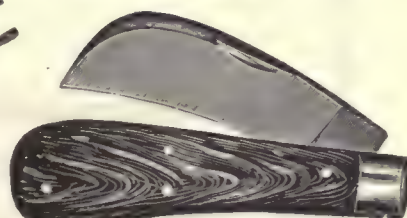
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No. 8140.



No. 8142.



No. 8148.

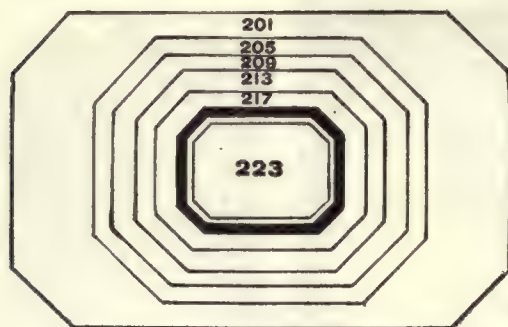


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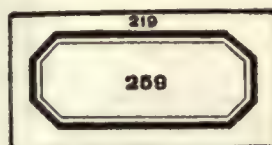


No. 8150.

8112. **JARS, Stoneware**, with handles and covers for storing ordinary chemicals. Preferable to a galvanized iron can for refuse. Capacity, gallons... $\frac{1}{2}$ 1 2 4 6 8
Diameter, inches..... 5 $6\frac{1}{2}$ $8\frac{1}{4}$ $10\frac{1}{4}$ $10\frac{3}{4}$ 12
Height, inches..... $5\frac{3}{4}$ 8 $8\frac{3}{4}$ $10\frac{1}{2}$ 13 $15\frac{1}{2}$
Each \$0.35 .50 .75 1.50 2.00 3.00
8114. **JARS, Stoneware**, with cover and nickel-plated metal stopcock, for storing distilled water, etc.
Capacity, gallons..... 3 5 8 10 15
Each 2.50 3.25 6.00 10.00 13.00
8116. **JAR, Stoneware**, for storing distilled water or acids, with ground stoneware stop-cock and water level. Capacity, 50 liters..... 30.00
8120. **JARS, Tumblers, Jelly**, with cover, 200 cc capacity..... per dozen .60
8140. **KETTLES, Evaporating**, graniteware, tin cover.
Manufacturer's rated capacity, quarts..... 2 4 8
Each60 .80 1.10
8142. **KETTLES, Infusion**, double boiler, of graniteware, with tin cover.
Manufacturer's rated capacity of inner kettle, quarts..... 2 4 8
Each 1.25 2.30 2.60
- KNIFE**, for glass cutting, see Glass Tubing Cutters.
KNIFE for mixing dough, see No. 5938.
8146. **KNIFE, Laboratory**, good steel blade 4 inches long; round wood handle. Useful for cutting corks, etc.25
8148. **KNIFE, Pocket**, one blade, excellent quality steel, iron lined cocoa handle, 4-inch..... .90
8150. **KNIFE, Pocket**, two blades crocus polished, iron lined, stag handle, 4-inch. An excellent all-round knife 1.50
- F6065. **KYMOGRAPH**. This Kymograph may be used either vertically or horizontally. The drum carrying the smoked paper, on which the tracings are made, is 15 cm in diameter by about 15 cm long and is rotated by means of a strong spring motor, which is enclosed in a heavy iron base. The speed is uniform, and is regulated by means of a magnetic control. Starting, stopping and regulation of speed is all done from the outside. The shaft carrying the drum is reversible, and each end has a clutch, in order to secure two speeds, a slow and a fast, both of which may be varied by means of the magnetic control. Range of slow speeds from one revolution in 18 minutes to one in 55 seconds; of fast speeds from one revolution in 42 seconds to one in 8 seconds. Complete with 100 sheets of gummed glazed paper..... 52.50
- F6069. **PAPER**, glazed and gummed, for use with No. F6065. Size, 15x48 cm.
..... Per 100 sheets .75



No. 8160.



219

259



No. 8162.



261

No. 8160.



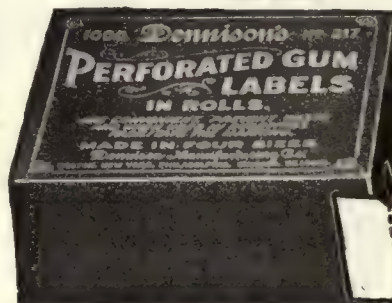
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No. 8164.



2001

No. 8166.



No. 8168.



No. 8176.

POTASS. CHROMIUM SULPHATE

CHROME ALUM.
 $K_2Cr_2(SO_4)_4 + 24H_2O$

No. 8172.

8160. LABELS, Dennison's Gummed, rectangular shape with red border.

No.	201	205	209	213	217	219	223	259	261
Length, mm.	64	42	37	30	27	38	21	33	52
Width, mm.	40	34	28	24	20	19	17	14	14
Per box	.08	.08	.08	.08	.08	.08	.08	.08	.08
Per carton of 12 boxes	.75	.75	.75	.75	.75	.75	.75	.75	.75

8162. LABELS, Dennison's Gummed, rectangular shape, with red border, in book form, perforated.

Size, about 5x9 inches.

No.	201	205	209	213	217	219	223
Size, mm.	45x68	40x50	30x40	28x33	24x32	22x42	19x24
Number of labels in book	225	300	500	750	750	750	1400
Per book	\$0.25	.25	.25	.25	.25	.25	.25
Per carton of 12 books	2.50	2.50	2.50	2.50	2.50	2.50	2.50

8164. LABELS, Dennison's Gummed, oval shape with red border. No. 229 239 241

No.	229	239	241
Length, mm.	42	27	21
Width, mm.	30	17	14
Per box	.08	.08	.08
Per carton of 12 boxes	.75	.75	.75

8166. LABELS, Dennison's Gummed, rectangular shape, large size, with red border, in boxes of 100.

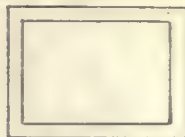
No.	2001	2002	2003	2004	2005	2006	2007
Size, inches.	1½x3¾	1x3¾	2x4¾	1x2¾	1½x4	1½x4	1½x2¾
Per box	.20	.16	.30	.16	.22	.20	.16
Per carton of 10 boxes	1.65	1.35	2.50	1.35	2.00	1.65	1.35

8168. LABELS, Dennison's Gummed, rectangular shape, with red border, in rolls, perforated, 1000 labels in a roll. Each roll is contained in special box with slot to permit drawing out labels as needed. Sizes same as in No. 8160.

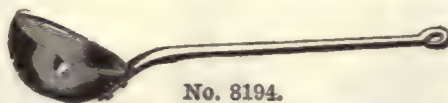
No.	205	209	217
Per roll	.85	.40	.60

8172. LABEL BOOK, containing labels for the most used chemicals and reagents, each label having name and symbol. Gummed, perforated, and arranged so that they may easily be removed without destroying the book. (Labels should be covered with melted paraffine after being put on the bottle, to protect them from acids, etc.) Book contains about 500 labels. .45

8176. LABELS, Gummed, Microscope Slide, of white paper with light border, 22 mm square, in boxes of 100. per box .10



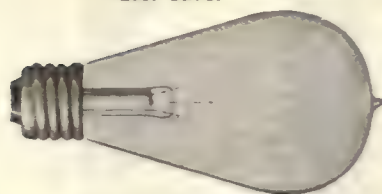
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No. 8194.



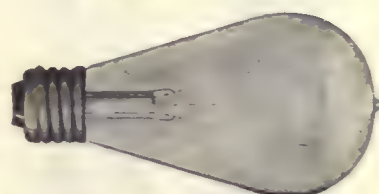
No. 8208.



No. 8200.



No. 8202.



No. 8211.

8178. **LABELS**, Gummed, Microscope Slide, same as No. 8176, but rectangular, 22x15 mm, in boxes of 100.....per box .10
8190. **LACQUER**, Colorless, for preserving polished metal surfaces. In ounce bottles. Per ounce .30
8192. **LACQUER**, Gold, in 1 ounce bottles.....Per ounce .40
- LACQUER BRUSH**, see Brush, Lacquer.
- LACTOMETERS**, see Hydrometers.
8194. **LADLES**, of wrought iron with handle and lip. Useful for fusing metals.
- | | | |
|-------------------------------|-----|-----|
| Diameter of bowl, inches..... | 2½ | 4 |
| Each | .25 | .30 |
- LAMPS**, Alcohol, see general heading Burners.
- LAMPS**, Microscope, see Microscope Accessories.

LAMPS, INCANDESCENT

In selecting incandescent lamps from those listed below, attention should be paid to the fact that the consumption of carbon filament lamps is approximately 3 watts per candle power, while that of tungsten filament lamps is approximately 1¼ watts per candle power.

8196. **LAMPS**, Incandescent, Miniature, tungsten filament, threaded base to fit No. 5124 Receptacle.
- | | | | |
|--------------------|--------|-----|-----|
| No. | A | B | C |
| Candle power | 1 | 1½ | 4 |
| Voltage | 2½ | 3½ | 6 |
| Each | \$0.25 | .30 | .35 |
8198. **LAMPS**, Incandescent, tungsten filament, Edison base to fit all Edison receptacles and sockets.
- | | | |
|--------------------|-----|-----|
| No. | A | B |
| Candle power | 4 | 6 |
| Voltage | 6 | 8 |
| Each | .60 | .60 |
8200. **LAMPS**, Incandescent, carbon filament, 110-volt, Edison base to fit all Edison receptacles and sockets. No.
- | | | |
|--------------------|-----|-----|
| No. | A | B |
| Candle power | 16 | 32 |
| Each | .28 | .50 |
8202. **LAMPS**, Incandescent, tungsten filament, 110-volt, Edison base to fit all Edison receptacles and sockets. No.
- | | | | |
|-------------|-----|-----|-----|
| No. | A | B | C |
| Watts | 20 | 25 | 40 |
| Each | .45 | .45 | .45 |
8204. **LAMPS**, Incandescent, tungsten filament, nitrogen filled, 110-volt, Edison base to fit all Edison receptacles and sockets. No.
- | | | |
|-------------|-----|------|
| No. | A | B |
| Watts | 75 | 100 |
| Each | .90 | 1.50 |
8206. **LAMPS**, Incandescent, colored glass, carbon filament, 110-volt; natural colors, not dipped; 16 c. p., Edison base to fit all Edison receptacles and sockets.
- | | | | | | |
|-------------|-------|------|-------|------|---------------|
| No. | A | B | C | D | E |
| Color | amber | blue | green | ruby | frosted white |
| Each | .80 | .50 | .55 | .55 | .45 |
8208. **LAMP**, Pocket Flash, for use in store rooms. Vulcanized fiber case with nickel-plated trimmings. Size, 1½x6½ inches, with tungsten bulb and battery 1.20
8209. **BATTERY** for No. 8208, for replacement..... .30
8210. **INCANDESCENT BULB** for No. 8208, for replacement13
8211. **LAMP**, Standard Incandescent, carbon filament, approximately 110 volts, 16 c. p., 64 watts, for stationary use. With certificate of candle power from the Electrical Testing Laboratories. Accuracy of rating, ¼%..... 2.70
- LAMPS**, Standard Incandescent, tungsten filament of special construction to obviate variable cooling of filament when it touches its anchor wires. More satisfactory as light standards than carbon filament lamps. With certificate of candle power from the Electrical Testing Laboratories. Accuracy of rating, ⅓%. In ordering, specify the voltage at which the lamp should be standardized. This may be between 100 and 130 volts.
- | | | | | | |
|-------------|----|----|----|----|-----|
| No. | A | B | C | D | E |
| Watts | 25 | 40 | 50 | 60 | 100 |
8212. **LAMPS** for stationary use..... 6.75 6.75 6.75 6.75 7.80
8213. **LAMPS** for rotating. 6.75 6.75 6.75 6.75 7.80



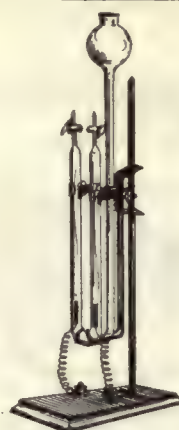
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No. 8220.



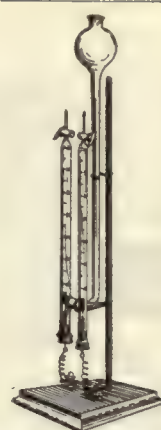
No. 8222.



No. 8226.



No. 8230.



No. 8234.

8214. **LAMP, DAVY'S SAFETY**, as used in mines. Height, about 25 cm. \$4.00

LANTERNS, Projecting, see **Catalog F of Physical Apparatus**.

8216. **LEAD SHOT** for cleaning bottles, etc.

Size No.	4	6	7	8	11
Per pound. ....	.20	.20	.20	.20	.20

F2857. **LEATHER BELTING, Round**.

Diameter, inches	$\frac{1}{8}$	$\frac{7}{32}$	$\frac{5}{16}$
Per foot .....	.10	.12	.18

LECTURE APPARATUS

8220. **LECTURE APPARATUS**, for Electrolytic Decomposition of Water, simple form with sliding graduated tubes and removable carbon electrodes 3.50
8222. **LECTURE APPARATUS** for Electrolysis of Water, improved form, with platinum electrodes that may easily be replaced by copper electrodes or by carbon electrodes for electrolysis of hydrochloric acid. (See Nos. 8238 and 8239.) Complete with support..... 6.80
8223. **GLASS PARTS** only of No. 8222..... 3.80
8226. **LECTURE APPARATUS**, Hoffman's Form, for electrolysis of water, hydrochloric acid, and ammonia, with ungraduated tubes, two stop-cocks and platinum electrodes, mounted on support as shown..... 11.50
8227. **GLASS PARTS** only of No. 8226 with platinum electrodes..... 8.50
8230. **LECTURE APPARATUS**, Hoffman's Form, same as No. 8226 but with tubes graduated to show volumetric composition. Complete with support 13.50
8231. **GLASS PARTS** only for No. 8230..... 10.50
8234. **LECTURE APPARATUS**, Hoffman's Improved Form, for decomposition of water, with graduated tubes, glass stop-cocks and removable platinum electrodes, complete with support 13.00
8235. **GLASS PARTS** only for No. 8234 with platinum electrodes..... 10.00
8238. **CARBON ELECTRODES** for use with Nos. 8220, 8222, 8234 and 8268, consisting of two rubber stoppers fitted with carbon electrodes..... .60
8239. **COPPER ELECTRODES**, same as No. 8238, but with copper instead of carbon electrodes .60
8240. **PLATINUM ELECTRODES**, same as No. 8238, but with platinum instead of carbon electrodes 2.75
8242. **SUPPORT STAND** only for Nos. 8222, 8226, 8230 and 8234 with binding posts..... 3.00
8246. **LECTURE APPARATUS**, Hoffman's Form, for showing volumetric composition of hydrochloric acid, with two stop-cocks, complete with support, as illustrated..... 10.80
8247. **GLASS PARTS** only of No. 8246..... 5.00
8250. **LECTURE APPARATUS**, Hoffman's, same as No. 8246, but with platinum electrodes, for demonstrating the volumetric synthesis of ammonia and water. Complete with support.. 8.50
8251. **GLASS PARTS** only of No. 8250, with platinum electrodes..... 5.50
8254. **LECTURE APPARATUS**, Hoffman's Eudiometer, similar to No. 8250, with platinum electrodes, two stop-cocks, and graduated arm. Complete with support..... 13.00
8255. **GLASS PARTS** only of No. 8254, with platinum electrodes..... 10.00
8258. **LECTURE APPARATUS** for Decomposition and Synthesis of Water, similar to No. 8250, but with platinum electrodes in middle of closed tube. Complete with support..... 11.50
8259. **GLASS PARTS** only of No. 8258, with platinum electrodes..... 8.50
8262. **LECTURE APPARATUS**, Hoffman's Form, for demonstrating the fixed proportions in the combination of hydrogen and chlorine to form hydrochloric acid. With glass stop-cock, ground stopper, and support stand..... 6.50
8263. **GLASS TUBE** only of No. 8262, with ground stoppers and stop-cock..... 4.00
- Note:**—For illustrations of Nos. 8246-62, see next page.



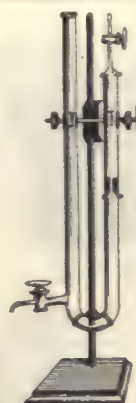
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No. 8250.



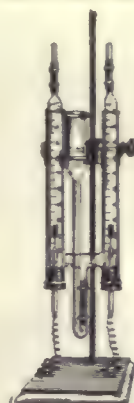
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No. 8258.



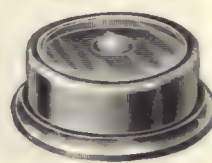
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No. 8268.



No. 8284.



No. 816.



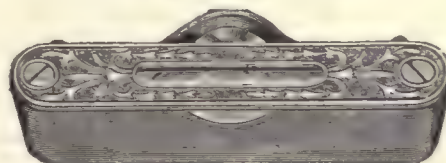
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No. 8292.

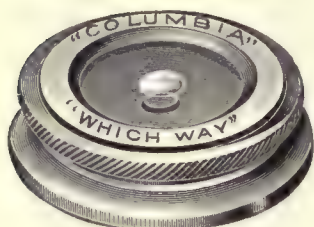


No. 8290.



No. 8294.

8268. **LECTURE APPARATUS, Osborne's Form**, for electrolysis of water and for study of conductivity of liquids, ionization, electro-plating and electrolysis of water. A simple, substantial form of electrolytic apparatus that can be used to demonstrate the principles involved in the theory of electrolytic dissociation. It consists of an outer U tube with graduated sliding tubes, shot valves, glass plug and platinum electrodes, which are easily replaced by carbon or copper electrodes (Nos. 8238 to 8240). It allows immediate change of liquids, permits the introduction of an indicator, cloth for bleaching, is readily cleaned, requires least amount of liquids to fill it. Complete as illustrated, on support with binding posts, with instructions for use **\$11.00**
8269. **GLASS PARTS** only of No. 8268..... **3.00**
8270. **SUPPORT STAND** only for No. 8268..... **3.00**
8276. **LENS PAPER, Japanese**, for cleaning lenses, in sheets 7x11 inches, in packages of 100 sheets. Per package..... **.35**
- LENSES, Magnifying**, see Magnifiers.
- LETTERS, Steel**, see Dies.
- LEVELING BULBS**, see No. 1902.
8284. **LEVEL, Bench, Adjustable**, with handle and accurately graduated vial. Length, 4 inches; handle and tube nicked, base japanned..... **3.30**
8288. **LEVEL, Mechanics', Iron**, 12 inches long, ground face and ends, japanned body, double plumb..... **2.00**
8290. **LEVEL, Mechanics', Wood**, ordinary type; 10 to 16 inches long. Oval top plate, two side views..... **.50**
8292. **LEVEL, Pocket, Brass**, ground flat on the base, nickel-plated; 2 inches long. Very useful in making apparatus..... **.50**
8294. **LEVEL, Pocket, Iron**, japanned, 3¼ inches long..... **.20**
816. **LEVEL, Round**, in brass case, for balance cases, drying ovens, incubators, etc. Diameter, 2.5 cm. **4.00**



No. 8296.



No. 8342.



No. 8344.



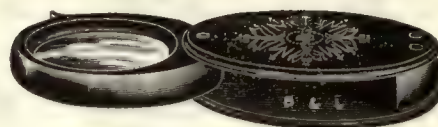
No. 8246.



No. 8306.



No. F261.



No. 8348.



No. 8350.

8296. **LEVEL**, Round, "Which Way," of steel, nickel-plated. Diameter, 3.5 cm..... \$0.90
 F261. **LEVELING SCREWS**, in sets of three, permitting the rapid leveling of board or glass plate. Made entirely of metal, the base of which is accurately planed. Base japanned, screw white nickel-plated. Height, 7.5 cm; range of adjustment, 13 mm..... **Pet set** 1.65
 8306. **LIBRARY PASTE**, best grade.

No.	A	B
Style	Collapsible Tube	4-ounce Screw-Cap Jar
Each .....	.15	.15

MAGNIFIERS

8342. **MAGNIFIERS**, Doublet, consisting of two plano convex lenses in a metal mount, for use either as a hand magnifier or in dissecting microscopes.

No.	A	B	C
Magnifying power, diameters.....	6	9	12
Focal distance, mm.....	41.6	27.8	20.8
Focal distance, inches.....	1.6	1.1	0.8
Working distance, mm.....	22	15	12
Diameter real field, mm.....	22	16	11
Each	1.00	1.00	1.00

8344. **MAGNIFIER**, Engravers' Glass, the standard magnifier for use in counting colonies of bacteria. Magnifying power, 3.5 diameters. (See Public Health Report of the United States Public Health Service Vol. XXX, No. 33, August 13, 1915)..... 1.00

8346. **MAGNIFIERS**, Linen Testers, extensively used in elementary biology work, and for various other purposes where a small compact magnifier is desired. Folds up into very small space.

No.	A	B
Diameter of opening, inches.....	1/4	1/2
Magnifying power, diameters.....	10	10
Each .....	.75	.75

8348. **MAGNIFIERS**, Pocket, in folding mount of rubber and zylonite, very light and durable.

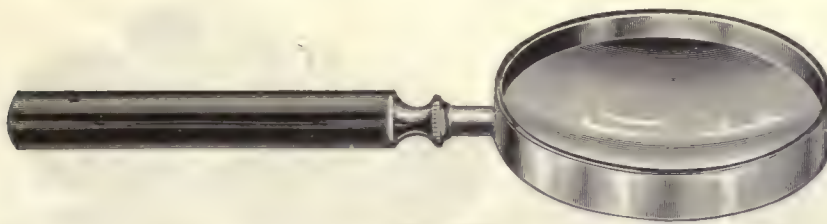
No.	A	B	C
Diameter of lens, mm.....	18	30	50
Magnifying power, diameters.....	5	3.5	2
Each .....	.50	.75	1.35

8350. **MAGNIFIERS**, Pocket, same as No. 8348, but with double lens.

No.	A	B	C
Diameter of lenses, mm.....	15, 20	25, 30	37, 44
Magnifying power, diameters.....	5-12	3.5-8	2.5-5
Each .....	.90	1.35	1.80

8352. **MAGNIFIERS**, Pocket, same as No. 8350, but with triple lens.

No.	A	B
Diameter of lenses, mm.....	12, 15, 18	15, 18, 20
Magnifying power, diameters.....	7-30	4-20
Each	1.10	1.13



No. 8356.



No. 8364.



No. 8360.



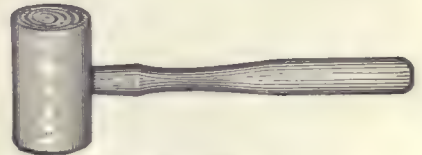
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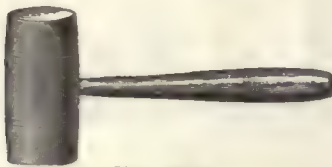
No. 8366.



No. 8368.



No. 8376.



No. 8378.



No. 8386.

8356. **MAGNIFIERS, Reading Glasses**, with nicked rim and ferrule, and with black wooden handle.

No.	A	B	C	D	E
Diameter of lens, inches.....	2	2½	3	4	4½
Focus, inches.....	5	6	7	10	12
Each	\$0.90	1.10	1.35	1.80	2.25

MAGNIFIERS, Triple Aplanat, the highest type of hand or dissecting magnifier. They are perfectly achromatic and free from distortion, have an extra long working distance, and furnish an unusually large, flat field.

No.	A	B
Magnifying power, diameters.....	9	12
Focal distance, mm.....	27.8	20.8
Focal distance, inches.....	1.1	0.8
Working distance, mm.....	24.5	18.4
Diameter real field, mm.....	20	15

8360. **Mounted for use in dissecting microscopes**..... 4.25 4.25

8361. **Mounted in folding case for hand use**..... 4.25 4.25

8364. **MAGNIFIER, Tripod**, giving a large, clear field and sufficient magnifying power for elementary botanical and zoological studies. The lens is focused by screwing up or down in the metal frame..... .75

8366. **MAGNIFIER, Watchmakers' Glass**, double convex lens in vulcanite mounting. Diameter, 25 mm; magnifying power, 3 to 5 diameters..... .60

8368. **MAGNIFIER, Watchmakers' Glass**, consisting of two lenses of 12 and 25 mm diameter. The front lens (12 mm) can be removed by unscrewing, thus permitting the use of the rear lens (25 mm). Magnifying powers, 4 and 7 diameters90

8372. **MAILING TUBES**, heavy pasteboard, 1½x12 inches Per dozen .35

8376. **MALLET, Rawhide**, round, 6-ounce..... 1.10

8378. **MALLET, Wood**, round, 3-inch face..... .25

MANOMETERS, see Gages.

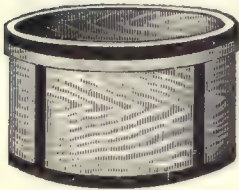
8382. **MATCHES, Swedish Safety**, in packages of 12 boxes Per package .16

MATRASSES, see Blowpipe Apparatus.

MATRASS HOLDER, see Blowpipe Apparatus.

8386. **MAUL**, of iron, with wooden face and hickory handle. Length of handle, 2 feet; diameter of head, 3½ inches; weight, 6 pounds..... 1.40

MEASURES, Calipers, see Calipers.



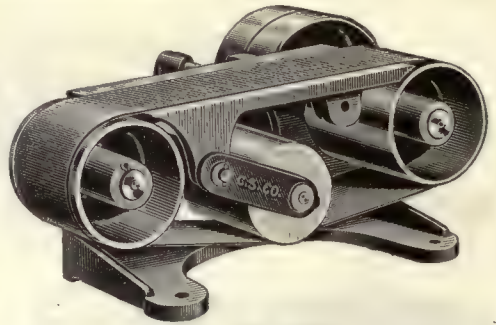
No. 8390.



No. 8396.



No. 8410.



No. 8430.



No. 8404.

8390. **MEASURES, Dry, Wood, iron bound.** Set of 5 pieces, 1, 2 and 4 quarts, 1 peck, $\frac{1}{2}$ bushel. \$1.60
8392. **MEASURES, Liquid, Agateware, with spout and handle.**
- | | | | | |
|-----------------------|-----|-----|-----|-----|
| Capacity, pints | 1 | 2 | 4 | 8 |
| Each | .40 | .50 | .70 | .80 |
8394. **MEASURES, Liquid, Polished Copper, tinned inside, with spout and handle.**
- | | | | | | |
|-----------------------|---------------|------|------|------|------|
| Capacity, pints | $\frac{1}{2}$ | 1 | 2 | 4 | 8 |
| Each | .95 | 1.15 | 1.50 | 1.90 | 2.70 |
8396. **MEASURES, Liquid, Tinned Iron, with spout and handle.**
- | | | | | | |
|-----------------------|---------------|-----|-----|-----|-----|
| Capacity, pints | $\frac{1}{2}$ | 1 | 2 | 4 | 8 |
| Each | .10 | .15 | .20 | .30 | .40 |
8400. **MEASURES, Liquid, Metric, polished brass, standard form.**
- | | | | | | | | | |
|------------------------|------|------|------|-----|-----|-----|-----|-----|
| Capacity, liters | 0.01 | 0.02 | 0.05 | 0.1 | 0.2 | 0.5 | 1 | 2 |
| Each | .25 | .30 | .40 | .50 | .60 | .70 | .80 | .90 |
8402. **MEASURES, Liquid, Metric.** Same as No. 8400. Set of seven pieces, 0.01 liter to 1 liter. 3.00
8404. **MEASURES, Liquid, Metric.** Same as No. 8400. Set of eight pieces, 0.01 liter to 2 liters. 3.90
- Note: "Standard Form" is that in which the diameter equals half the height.
- MEASURES, Metric Rules, see Scales.**
- MEASURING MICROSCOPE, see Microscopes.**
- MECHANICAL STAGE, see Microscope Accessories.**
8410. **MELTING POINT TUBE, Thiele's, of hard glass** 1.00
- MERCURY BULBS, see No. 1902.**

METALLOGRAPHIC APPARATUS

BLAST, Hot Air for drying freshly polished specimens, see No. 1388.

DESICCATOR CABINET for storing polished specimens, see No. 3790.

FURNACES for heat treating, see general heading **Furnaces**.

8430. **GRINDING MACHINE, Endless Belt Type, for rough grinding, for large or small metal specimens.** Width of belt, 4 inches; dimensions of flat top of machine, 6x10 inches; intended speed of operation, about 1,000 r.p.m. Complete as illustrated with automatic belt tightener, tight and loose pulleys, belt shifter and three grinding belts of different degrees of fineness \$35.00

In ordering, kindly state whether alundum or carborundum belts are desired. The former should be used for steel, malleable iron, drop forgings, etc.; the latter for brass, bronze, cast iron and wrought iron.

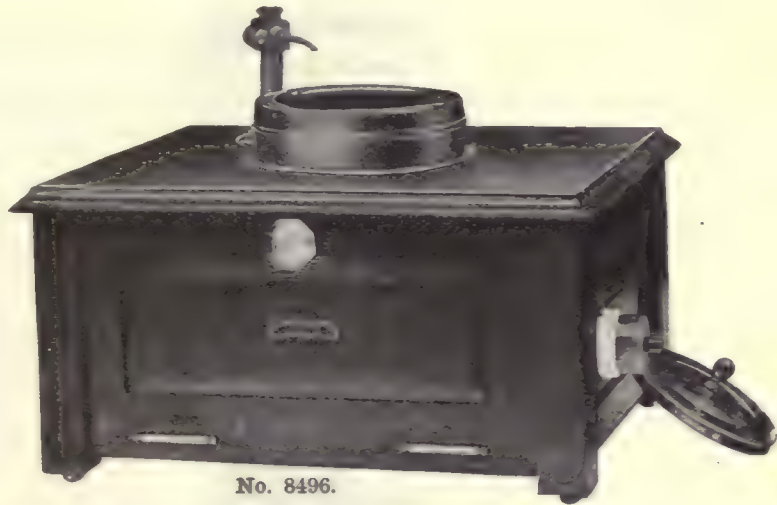
8431. **EXTRA GRINDING BELTS** for No. 8430.

No.	A	B	C
Degree of fineness.....	coarse	medium	fine
Each .....	.70	.70	.70

See note under No. 8430.



No. 8442.



No. 8496.



No. 8435.

GRINDING MACHINE, Reciprocating Type, for fine grinding, designed to replace hand grinding with fine emery papers from No. 0 to No. 0000, preliminary to polishing. The machine consists of two carriages which move slowly in a horizontal plane with reciprocating motion. Each carries a glass plate 5x2 inches to which emery papers may be fastened by filtered adhesive. Complete with four glass plates covered with special metallographic emery paper of different degrees of fineness.

8434. With tight and loose pulleys and belt shifter, for belt drive..... 65.00

8435. With direct connected motor, with worm gear drive.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	115.00	115.00	115.00	115.00

8438. **EMERY PAPERS, Metallographic**, specially prepared for Metallographic purposes.

No.	0000	000	00	0	1	1G
Per quire.....	2.30	2.00	1.80	1.75	1.70	1.70

8442. **HACK SAW, Power**, with tension device to produce pressure on the saw during the draw cut. Capacity of vise, 4x4 inches; length of blade, 12 inches; size of pulley, 13x2 3/4 inches; speed of operation, 60 to 90 r.p.m.; net weight, 110 pounds; shipping weight, 120 pounds.. 20.00

HARDNESS TESTING APPARATUS, see general heading **Hardness Testers**.

MICROSCOPES, Metallurgical, write for information.

PHOTOMICROGRAPHIC APPARATUS for Metallography, write for information.

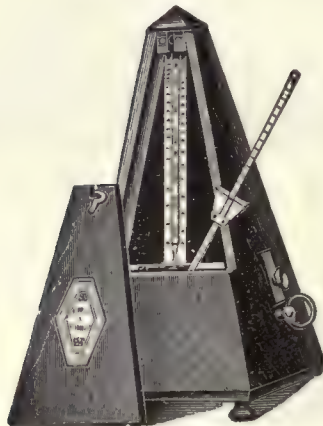
8496. **POLISHING MACHINES, Automatic Spray Type**, for the final polishing of metal specimens by means of levigated alumina. The machine consists of a motor mounted in a polished oak cabinet, to which is attached a hard rubber horizontal polishing disk, 6 inches in diameter, covered with special broadcloth. A small bronze pump, driven by the motor, pumps alumina polishing liquid from a reservoir in the cabinet and forces it through the spray nozzle upon the center of the polishing disk. The fineness of the spray is adjustable by a valve. The reservoir can be refilled from the outside. A special stirring device prevents precipitation of the alumina. Dimensions of the cabinet, 22x18 inches. Complete as described with one bottle of polishing liquid.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	\$150.00	150.00	150.00	150.00

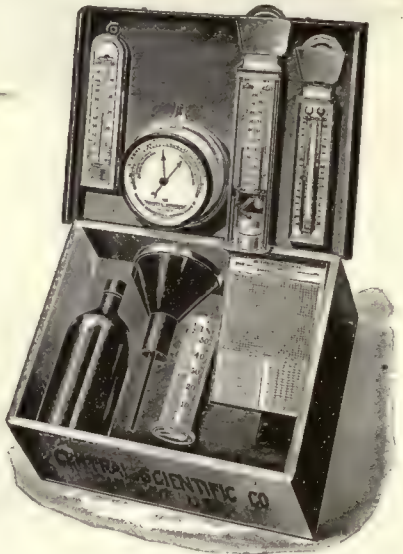
8497. **POLISHING CLOTH COVERS** for No. 8496, cut to correct size.....per six 3.00



No. 8512.



No. F781.



No. 8510.

8498. **LEVIGATED ALUMINA** for use with No. 8496, specially prepared for obtaining a correct and rapid finish; in powder form.

No.	A	B	C
For use with.....	steel and hard	medium hard	soft
	metals	metals	metals
Per ounce.....	.95	1.60	2.30

PYROMETERS, see general heading **Pyrometers**.

MERCURY STILL, Hulett's, see **Distilling Apparatus**.

8510. **METEOROLOGICAL SET, Universal**, a complete set of meteorological instruments suitable for a beginner, and of such a quality as to give satisfaction. The set comprises a 5 inch metal case aneroid barometer, 8 inch boxwood thermometer with F., R. and C. scales, 8 inch maximum and minimum (Six's) thermometer with magnet, 8 inch Mason's wet and dry bulb hygrometer with boxwood scale, 5 inch Howard rain gauge, and a calendar for keeping a record of the instruments in the set. Packed in neatly finished box..... 30.00

8512. **METEOROLOGICAL SHELTER**. The latest pattern Weather Bureau Instrument Shelter. (Weather Bureau Bulletin No. 459.) Sufficiently large to hold Barograph or Thermograph and the two instruments shown in the cut. Made of best quality white pine wood, painted three coats lead paint, swing door with lock and key. Complete with screws for mounting. Shipped "knocked down"..... 35.00

WEATHER FORECAST CHART, see No. 14390.

For other **Meteorological Instruments**, see **Anemometers, Barometers, Gages, Hygrometers, Sunshine Recorders, Thermometers and Weather Instruments**.

METERS, Gas, see Nos. 6786 and 6956.

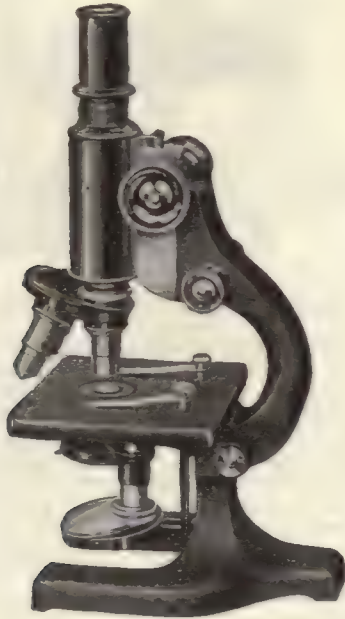
F781. **METRONOME**, for counting seconds and fractional parts of a second, etc. In fine mahogany case 5.00

F782. **METRONOME**. Same as No. F781, but with adjustable bell attachment. The bell may be made to strike every second beat, third beat, fourth beat or sixth beat..... 7.00

F783. **METRONOME**, with electrical connection. No. F781 Metronome fitted with mercury cups and binding posts for tracing time on a revolving drum in connection with a time marker. Makes contact at each beat of the pendulum..... 18.00

MICROSCOPES

We desire to advise our friends and patrons that we are agents for the celebrated Spencer Microscopes, manufactured by the Spencer Lens Company, and carry a complete stock of all Microscopes listed herein. The Spencer Microscopes are of recent design and contain many important features not possessed by any other microscope in the world. The Spencer lenses are guaranteed against all defects. We will be glad to send any one of the Spencer Microscopes to responsible persons for comparison, grade for grade, with any objective or stand of American or European manufacture, with the utmost confidence that the Spencer will be found to be unsurpassed by any and only equaled by few. We unhesitatingly recommend the Spencer Microscopes as representing better values than any other instrument on the market.



No. 8532.

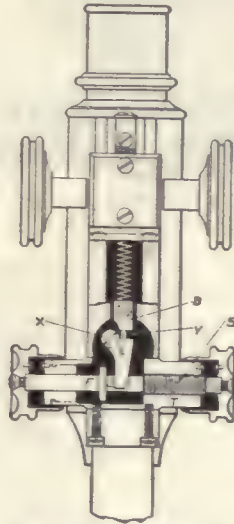


Diagram of Side Fine Adjustment "D."

8532. **MICROSCOPE, Spencer No. 44**, the most popular of all Spencer Microscopes. Many hundred are in daily use in medical, educational and general laboratories.

The Body Tube is standard, taking standard objectives and oculars.

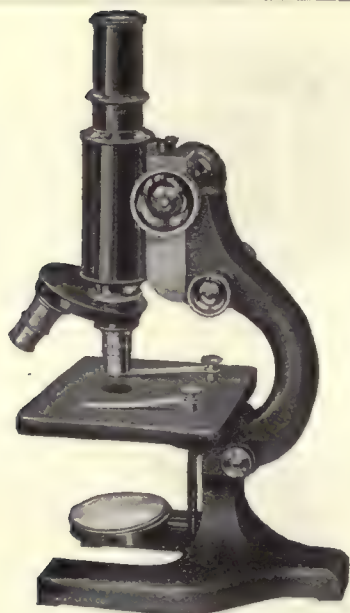
The Arm is strong and very graceful, fitted with the patented side fine adjustment "D," possessing many exclusive features. It has but two bearing surfaces and three working parts. The patented one-piece construction bearing carries the solid steel screw. This screw, with no less than twenty threads engaged even at the limit of its motion, has a heavy flange, F, working against the lever, L. When the screw is turned in such a direction as to carry F forward, the lever is so swung as to raise the body tube. The reverse motion permits the tube to be lowered under the influence of the spring. The focusing buttons at either end of this screw travel laterally and serve as a visible index of the center of the fine adjustment action. Steel pins in the heads form positive stops at either end of the excursion. The direction in focusing is the same with both fine and coarse adjustments. One revolution moves the tube 0.2 mm.

The Stage, 112x108 mm, is completely covered with hard rubber, vulcanized directly to the stage plate. Distance is 80 mm from optical axis to arm.

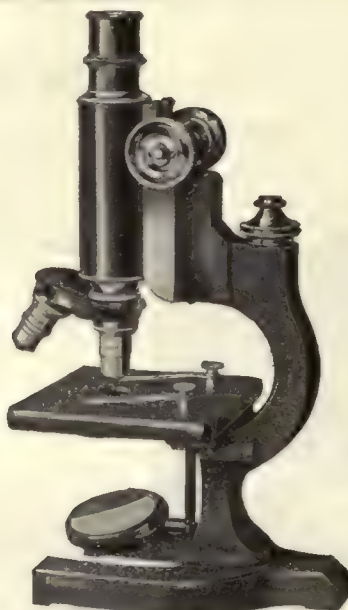
The Substage is standard quick-screw form.

The Down-Swing Condenser Mounting may be supplied at \$7.50 additional.
Furnished in hardwood cabinet with lock and key.

No.	44A	44B	44C	44D	44E	44F	44H
Abbe condenser.....	....	....	....	....	N. A. 1.20	N. A. 1.20	N. A. 1.20
Nosepiece .....	....	double	....	double	double	double	triple
Objectives, equivalent focus, mm.....	16.4	16.4	16.4	16.4	16.4	16.4	16.4, 1.8
Achromatic oculars..	10x	10x	6x, 10x	6x, 10x	10x	6x, 10x	Oil imm.
Each	\$44.50	49.25	46.25	51.00	58.25	60.00	90.00



No. 8536.



No. 8540.

8536, **MICROSCOPE, Spencer No. 64.** A standard microscope for general biology; used in hundreds of laboratories.

The Body Tube is our standard, 37 mm in diameter, taking standard objectives and oculars.

The Arm and its side fine adjustment "D" are identical with those of Microscope No. 8532.

This adjustment is patented, is exceedingly durable, will withstand very hard usage and not develop lost motion. (See description and diagram illustration under No. 8532.) It travels laterally, giving an instant visible index of the position of the adjustment relative to the total excursion. Steel pins in heads of buttons produce an absolute stop at either end of excursion, preventing jamming or binding of screw. There are but two bearing surfaces and three working parts. The main bearing is made of one single piece. One revolution moves the tube 0.2 mm. Adjustment ceases to work when objective comes in contact with slide.

The Stage, 112x108 mm, is completely covered with hard rubber, vulcanized directly to the stage plate. Beneath the stage is an iris diaphragm operated by a knurled wheel, 62 mm in diameter. Abbe Condenser is supplied when ordered, and is fitted in a simple spiral focusing substage ring. Distance is 80 mm from optical center to arm.

Furnished in hardwood cabinet, with lock and key.

No.	64A	64B	64C	64D	64E	64F	64H
Abbe condenser.....	....	....	....	....	N. A. 1.20	N. A. 1.20	N. A. 1.20
Nosepiece .....	....	double	....	double	double	double	triple
Objectives, equivalent							
focus, mm.....	16,4	16,4	16,4	16,4	16,4	16,4	16,4,1.8
							oil imm.
Achromatic oculars ..	10x	10x	6x, 10x	6x, 10x	10x	6x, 10x	6x, 10x
Each	\$36.00	40.75	37.75	42.50	49.75	51.50	85.00

8540. **MICROSCOPE, Spencer No. 65.** This instrument is similar to No. 8536, except for the shape of arm and the type of fine adjustment. It is highly recommended for general laboratory work and is a very high grade microscope at moderate cost.

The Body Tube is our standard, taking standard objectives and oculars.

The Arm is fitted with the sensitive and accurate lever type fine adjustment. One revolution moves the tube 0.5 mm. The action ceases to work when the objective comes in contact with slide.

The Stage, 112x108 mm, is completely covered with hard rubber, vulcanized directly to the stage plate. Distance is 80 mm from optical axis to arm. Beneath the stage is an iris diaphragm operated by a knurled ring.

A Substage Ring, with spiral slot for focusing the Abbe condenser, is supplied when ordered or may be applied at any time without returning the microscope to the factory. An automatic device locks the upper iris open when condenser is in place. The standard mirror, 50 mm in diameter, plane and concave, is supplied on the usual swinging mirror bar.

Furnished in hardwood cabinet with lock and key.

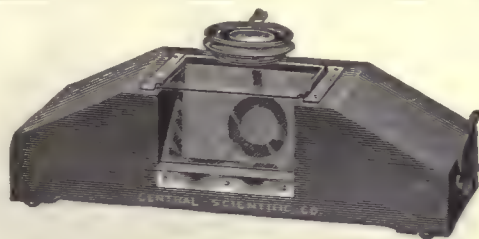
No.	65A	65B	65C	65D	65E	65F	65H
Abbe condenser.....	....	....	....	....	N. A. 1.20	N. A. 1.20	N. A. 1.20
Nosepiece .....	....	double	....	double	double	double	triple
Objectives, equivalent							
focus, mm.....	16,4	16,4	16,4	16,4	16,4	16,4	16,4,1.8
							oil imm.
Achromatic oculars ..	10x	10x	6x, 10x	6x, 10x	10x	6x, 10x	6x, 10x
Each	33.00	37.75	34.75	39.50	46.75	48.50	82.00



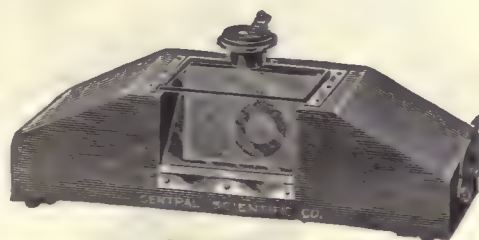
No. 8544.



No. 8560.



No. 8564.



No. 8572.

8544. **MICROSCOPE, Spencer No. 66.** An excellent instrument for general laboratory work. A splendid microscope at moderate cost.

The Body Tube is our standard, taking standard objectives and oculars.

The Arm is the handle arm type with lever fine adjustment "C." One revolution of the micrometer screw moves the body tube 0.5 mm. The action ceases to work when the objective comes in contact with slide.

The Stage, 103x95 mm, is completely covered with genuine hard rubber, vulcanized directly to the stage plate. Distance is 60 mm from optical axis to base of arm. The iris diaphragm is operated by a knurled ring just beneath the stage.

A Substage Ring, for attaching and focusing the Abbe condenser by means of a spiral slot, is supplied when the condenser is ordered or may be added at any time.

The Mirror is plane on one side, concave on the other, 50 mm in diameter, mounted on a swinging bar.

Furnished in hardwood cabinet, with lock and key.

No.	66A	66B	66C	66D	66E	66F	66H
Abbe condenser.....	....	....	....	....	N. A. 1.20	N. A. 1.20	N. A. 1.20
Nosepiece .....	....	double	....	double	double	double	triple
Objectives, equivalent focus, mm.....	16.4	16.4	16.4	16.4	16.4	16.4	16.4, 1.8 oil imm.
Achromatic oculars ..	10x	10x	6x, 10x	6x, 10x	10x	6x, 10x	6x, 10x
Each	\$33.00	37.75	34.75	39.50	46.75	48.50	82.00

MICROSCOPE, Brinell, see Hardness Testers.

8560. **MICROSCOPE, Demonstration.** With the exception of the tube, this stand is made entirely of aluminum, thus making it very light. This, with the convenient handle, makes it superior to all others for handing from person to person during class demonstrations. The objective is accurately and easily focused by a spiral movement which is so arranged that the objective may be securely fastened in any focus. The objective is always in sight, thereby being easier to focus, and to exchange for another. The slide is placed upon the stage as in any other microscope and there is no danger of disturbing the cover glass. Furnished with 8x eyepiece and 16 mm objective..... 13.50

8564. **MICROSCOPE, Dissecting, Barnes**, with hardwood polished base, movable glass stage, mirror, and two-lens magnifier. Fine screw and also sliding adjustment. Block is provided with pocket for holding dissecting tools..... 2.75

8565. **MAGNIFIER** only of No. 8564, without holder..... .90

8566. **HOLDER** only of No. 8564, with vertical rod $\frac{1}{4}$ inch in diameter..... .25

8567. **MAGNIFIER AND HOLDER** of No. 8564, complete 1.15

8568. **BLOCK** only of No. 8564 with mirror and stage, but without magnifier and holder..... 1.50

8569. **GLASS MIRRORS** only of No. 8564..... each .09

per dozen .90

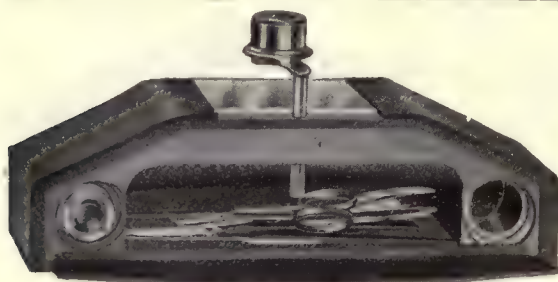
8570. **GLASS STAGES** only of No. 8564..... each .09

per dozen .90

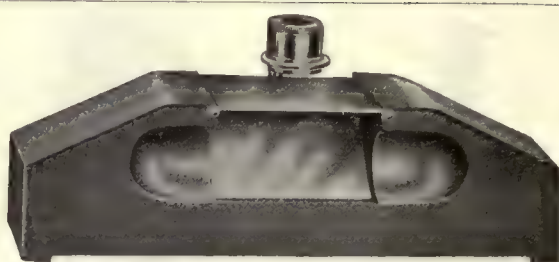
8572. **MICROSCOPE, Dissecting**, same block as No. 8564, fitted with 12x Doublet Magnifier which gives perfect definition..... 3.00

Note:—Other size Doublets may be furnished, if desired, in place of the 12x at the same price.

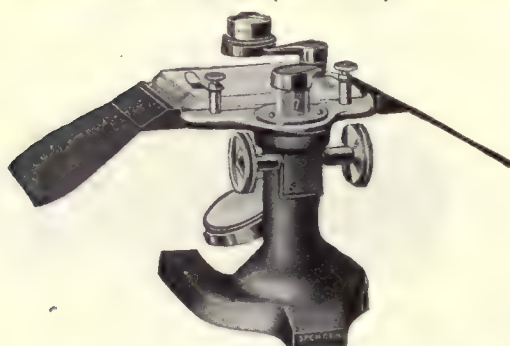
8573. **HOLDER** only of No. 8572 for doublet magnifiers30



Nos. 8577-80 (rear view).



Nos. 8577-80 (front view),



No. 8584.



No. 8588.

MICROSCOPE, Improved Dissecting. The parts of the block at either side of the mirror are cut out to allow light from the sides to strike the mirror, thus doing away with the necessity of the operator facing the source of light in order that the light may strike the mirror. The block is hollow beneath and back of the mirror, forming a convenient receptacle for dissecting tools and lenses. This is closed by a door which is hinged at the lower edge of the block. This is most convenient because it is not necessary to remove the specimen from the stage or the lens from the holder when a new dissecting tool or lens is wanted. The lens is held in an arm which permits movement from side to side and provides for focusing. A black and white metal background is furnished with each instrument.

8577.	MICROSCOPE, Dissecting, with 9x Doublet	\$3.30
8578.	MICROSCOPE, Dissecting, with 12x Doublet	3.30
8579.	MICROSCOPE, Dissecting, with 9x Triple Aplanat	6.50
8580.	MICROSCOPE, Dissecting, with 12x Triple Aplanat	6.50
8584.	MICROSCOPE, Spencer Dissecting. An extremely well made, thoroughly serviceable and convenient instrument at a very moderate cost. It is made with special reference to stability, ease of manipulation and durability. The focusing is accomplished by diagonal rack-and-pinion, moving a solid brass rod, whose bearings provide great steadiness and a very smooth movement of long range, so that lenses of long focus may be used. Two milled pinion heads allow either hand to be used in focusing. An extra large stage is provided, covered with a heavy polished glass plate, 75 mm x 100 mm, easily removed. The jointed lens arm permits the lens to be used over any part of the stage. Plane and concave mirror is furnished. The hand rests are of metal, detachable. In hardwood cabinet.	

No.	A	B	C	D
Number of lenses.....	1	2	1	2
Type of lens.....	doublet	doublet	triple aplanat	triple aplanat
Magnifying power, diameters.....	9	6, 12	9	6, 12
Equivalent focus, mm.....	27.8	41.6, 20.8	27.8	41.6, 20.8
Working distance, mm.....	15	22, 12	24.5	36.8, 18.4
Each	10.75	11.75	14.25	18.50

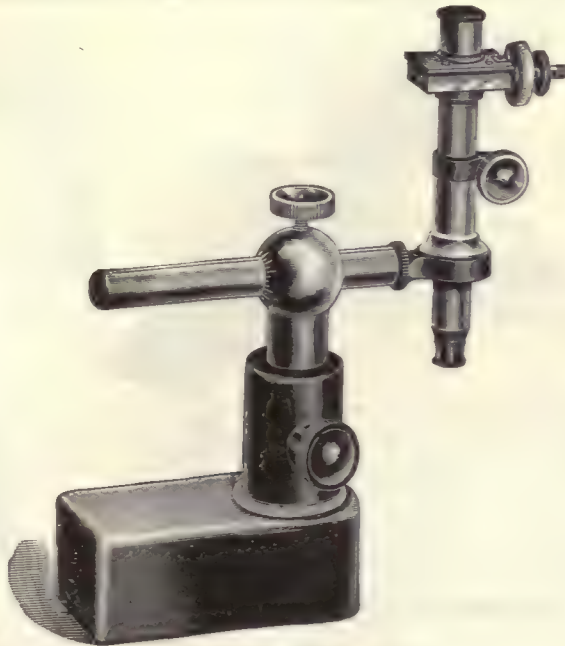
8588. **MICROSCOPES, Spencer Dissecting**, similar in construction to No. 8584, with the exception that instead of the rack-and-pinion focusing adjustment it is equipped with a friction sliding tube adjustment. A button at the side of the pillar moves a strong cylindrical lens arm support, whose bearings extend the whole length of the inner surface of the hollow pillar, giving a steady, smooth movement. Without hand rests, in hardwood cabinet.

No.	A	B	C	D
Number of lenses.....	1	2	1	2
Type of lens.....	doublet	doublet	triple aplanat	triple aplanat
Magnifying power, diameters.....	9	6, 12	9	6, 12
Equivalent focus, mm.....	27.8	41.6, 20.8	27.8	41.6, 20.8
Working distance, mm.....	15	22, 12	24.5	36.8, 18.4
Each	9.00	10.00	12.25	16.50

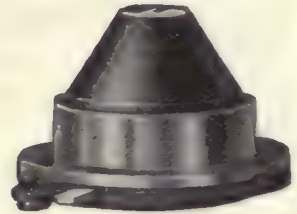
8589. **METAL HAND-RESTS** for use with No. 8588per pair .75



No. F585.



No. F586.



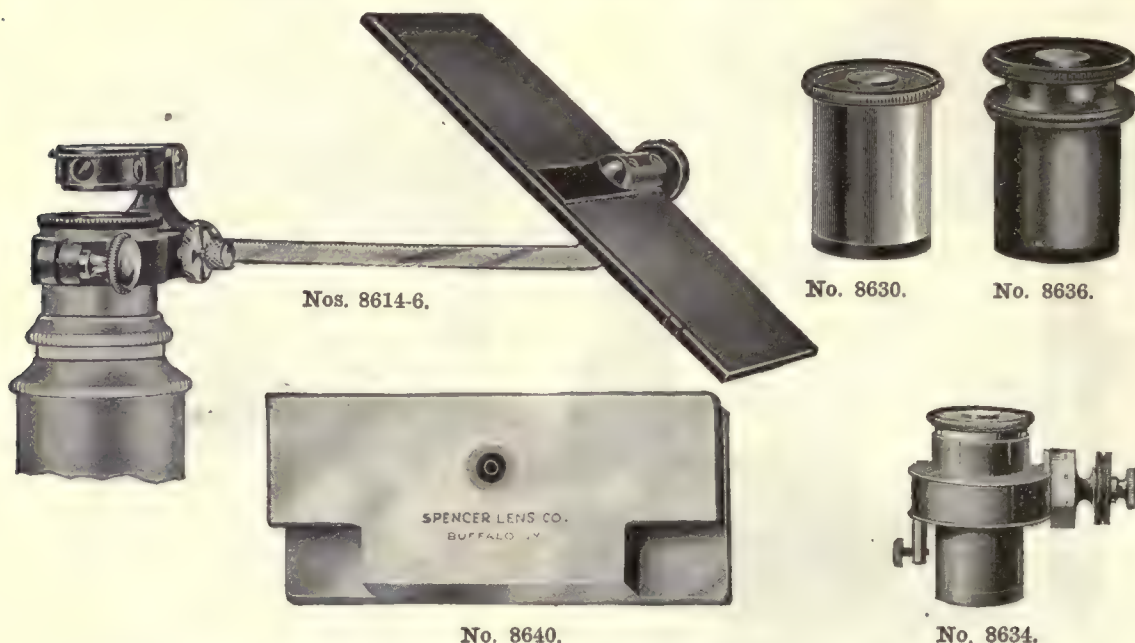
No. 8610.

- F584. MICROSCOPE, Measuring, Mounted.** A plain microscope without micrometer. Fitted with fixed cross hairs, tube and clamp collar. Diameter of tube, 22 mm. Magnification, about 30 diameters. Complete with No. F591 Support..... **\$25.50**
- F585. MICROSCOPE, Measuring.** Same as No. F584, without support..... **13.50**
- F586. MICROSCOPE, Measuring, Mounted.** Similar to No. F584, but with eyepiece micrometer. This micrometer is of new design and is guaranteed to be of the highest order of workmanship and accuracy. The pitch of the micrometer screw is 0.25 mm, and its range is 10 mm; since the micrometer head is divided into 100 parts it is possible to read to 0.0025 mm at the cross hairs. Since the magnification of the objective is about 3 diameters this is equivalent to a reading of about 0.0008 mm on the object being measured. Total magnification, about 30 diameters. Complete with No. F591 Support..... **45.00**
- F587. MICROSCOPE, Measuring.** Same as No. F586, without support..... **33.00**
- F591. MICROSCOPE SUPPORT.** A heavy, adjustable support for measuring microscopes. The microscope can be held rigidly in any position, as all joints can be tightly clamped. The base is sufficiently heavy to insure the stability required in a microscope used for accurate measurements. The top of the base is machined, so as to enable the attaching of stages or other accessories. The diameter of the horizontal and vertical arms is the same and the microscope may be clamped in a horizontal position, so as to read a vertical scale. Vertical range about 9 cm; horizontal range about 12 cm. Illustration shows Microscope No. F587 used in connection with the support. Support only, without microscope **12.00**
- MICROSCOPES, Metallurgical, see Metallurgical Apparatus.**
- MICROSCOPES, Projection, see Catalog F of Physical Apparatus.**

MICROSCOPE ACCESSORIES

(Alphabetically Arranged.)

- 8610. ABBE SUBSTAGE CONDENSER.** In order to secure the best results with objectives of high power, an Abbe Condenser must be used. The condenser illustrated has an aperture N. A. 1.20 and meets all the requirements of practical work. It is fitted with an iris diaphragm beneath to modify the amount of light, and is also provided with a ring beneath the iris to hold a blue glass for cutting out the yellow rays of artificial light; or to hold a center stop which to some extent will provide dark field illumination. The mounting is like the cut for the friction collar substages or is swung on the arm of the down-swing condenser mounting..... **9.00**
- 8614. CAMERA LUCIDA, Abbe's,** designed to satisfy the demands of the serious laboratory worker. It has a very large mirror, 70 mm x 105 mm, which is supported on adjustable, graduated mirror bar. Its unique, compact mounting makes it possible to place the eye sufficiently close to the prism so that the pupil takes in all of the divergent rays coming from the whole of the field of the ocular, making the field appear as large and the object very nearly as distinct as when viewed without the camera. The prism is so mounted that the opening in the silvering can be lowered in the case of the higher power oculars, or raised with the lower powers until it comes to the exact focus of the ocular. The prism can be so centered by

**CAMERA LUCIDA, Abbe's, Continued.**

two concentric screws that the field is free from color to the extreme edge. The light from it is modified by a series of smoked screens of different densities which may be revolved in and out of line between the mirror and the prism. It is made for the standard size microscope tubes, now in use by practically all American and European makers. Complete in hardwood case \$20.00

8616. **CAMERA LUCIDA**, same as No. 8614, with the exception that the prism is permanently centered at the factory and that there is no means for modifying the light from the ocular. The prism is the same size and mounted in a similar way. There are no loose parts to get out of place when the prism is moved in and out of the optical center. Complete in hardwood case 12.00

8630. **EYEPIECES, Huyghenian**. In arranging the focal distance of the Spencer eyepieces, the method has now been adopted of marking them with figures that indicate in each case how many times the eye-piece enlarges the objective image, projected the distance of distinct vision (250 mm or 10 inches). For example, the 4x eyepiece magnifies the objective image four times, and the magnification of the 8x eyepiece will be twice as great under similar conditions. A 10x ocular now takes the place of the old 8x and a 5x takes the place of the 4x, the old designation being based on the magnifications of the image projected the distance of the optical tube length, 160 mm. The eyepieces are made to fit the standard tube of the Royal Microscopical Society.

No.	A	B	C	D	E	F
Magnifying power, diameters.....	4	5	6	8	10	12
Equivalent focus, mm.....	62.5	50	40	30	25	20
Equivalent focus, inches.....	2½	2	1¾	1½	1	¾
Each	1.75	1.75	1.75	1.75	1.75	1.75

8634. **EYEPIECE, Micrometer**, with movable scale 5 mm in length, divided into ¼ mm divisions. The graduated drum, divided into 100 divisions, moves the scale ¼ mm for each revolution, thus permitting readings to be made to 1/400 mm. This instrument has a decided advantage over the filar micrometer in that it is not necessary to move the cross hairs the entire length of the object. Complete with case..... 30.00

8636. **EYEPIECES, Micrometer**, with fixed scale, providing a convenient method of using the micrometer scale. The eye lens is mounted in an adjustable sleeve permitting the scale to be brought into exact focus. Scale graduated to 5 mm in 1/100 mm divisions.

No.	A	B
Magnifying power, diameters.....	6	10
Each	5.00	5.00

8640. **ILLUMINATOR, Dark Field**, for use on any microscope. The condenser is mounted in a solid piece of brass with slots at the end for the stage clips of the microscope. It permits the use of slides on the top surface. The top surface of the condenser is provided with a little ring by which it may be carefully centered. Direct sunlight may be used. Fairly good results may be obtained by using a Welsbach light, but the best source of light is the electric arc light. No. 8682 Arc Light is especially constructed for such work. Complete in neat case, including special diaphragm for 1.8 mm oil immersion objectives..... 10.00

ARC LAMP for use with No. 8640, see No. 8682.



No. 8648.



Nos. 8662-7.



No. 8656 (shown in use).



No. 8656.

8648. **ILLUMINATOR, BULL'S-EYE CONDENSER** for the illumination of opaque objects and for throwing parallel rays of light upon the mirror from an artificial source in ordinary work with transparent objects. Mounted as shown. Diameter of lens, 75 mm. \$8.00
8650. **IMMERSION OIL, Cedarwood**, in 1-ounce vials. per vial .36
8656. **INCUBATOR, Electric**, for use on microscope stages. Especially valuable in the Widal test, for the cultivation of bacteria, yeasts, spirochetes and tumor cells, and for the observation of malarial parasites. Dimensions, $3\frac{1}{2} \times 2 \times 1\frac{1}{2}$ inch over all, with incubating chamber $3 \times 1 \times \frac{1}{2}$ inch deep, having a removable glass bottom, consisting of a regular microscope slide. The top is a piece of clear mica with a hole cut through the center through which the lens is passed. A rubber washer is provided for sealing the opening. Complete with heater, thermometer, temperature regulator for any temperature from 80° to 110°F. , cord and special plug for attachment to any regular 110-volt electric lamp socket, in velvet lined case. 18.00

LAMPS FOR MICROSCOPY

8662. **LAMPS, Microscope, Radio**, for use with any microscope. Consists of a sheet metal housing, nicked and highly polished, $6\frac{1}{4}$ inches in height, mounted on a jointed stand, permitting adjustment at any angle. Complete with special 40 watt Radio globe with concentrated metal filament, one each Ray Filter Blue and White-Ground, 6 feet of cord and connecting plug.
- | | | |
|-----------------|------|------|
| No. | A | B |
| For volts. | 110 | 220 |
| Each | 8.00 | 8.50 |
8663. **LAMPS, Microscope, Radio**, same as No. 8662, but with Daylite Filter instead of Blue Filter.
- | | | |
|-----------------|-------|-------|
| No. | A | B |
| For volts. | 110 | 220 |
| Each | 10.00 | 10.50 |
8666. **LAMPS, Microscope, Radio, for Darkfield Illumination**, similar to No. 8662, but with special Radio-Nitrogen Globe for high power illumination in dark-field work. Complete with Blue and White Ground Filters, connecting cord and plug. No.
- | | | |
|-----------------|-------|-------|
| No. | A | B |
| For volts. | 110 | 220 |
| Each | 10.00 | 15.50 |
- Note:—No. 8666B includes rheostat for reducing voltage to safe amount for Radio-Nitrogen Globe.
8667. **LAMPS, Microscope, Radio**, same as No. 8666, but with Daylite Filter instead of Blue Filter.
- | | | |
|-----------------|-------|-------|
| No. | A | B |
| For volts. | 110 | 220 |
| Each | 12.00 | 17.50 |
- Note:—No. 8667B rheostat.
8670. **ADAPTER** for Nos. 8662 and 8663, to permit a Radio-Nitrogen Globe to be used for dark-field work 1.50
8671. **RADIO GLOBE**, 40 watts, 110 volts, for Nos. 8662 and 8663. 1.50
8672. **RADIO GLOBE**, 40 watts, 220 volts, for Nos. 8662 and 8663. 2.00
8673. **RADIO-NITROGEN GLOBE**, 100 watts, 110 volts, for Nos. 8666 and 8667. 2.00
8674. **RHEOSTAT**, for use with Radio-Nitrogen Globe No. 8673 on 220 volt circuit. 5.00
8675. **DAYLITE FILTER** for use with Radio Lamps 2.50
8676. **BLUE FILTER** for use with Radio Lamps.75
8677. **WHITE-GROUND FILTER** for use with Radio Lamps.50



No. 8682.



No. 8688.



No. 8694.

8682. **LAMP, Hand-Feed Arc**, the most powerful light source for microscopical work. It may be run on any house circuit, either A.C. or D.C., using the proper rheostat. The carbons may be moved independently or at the same time. A window is provided for observing the arc. The light rays are focused by means of a condenser in a sliding tube. A blue glass and a ground glass are provided, to fit in a groove in front of the condenser. The lamp is adjustable as to height and angle. Complete with blue and ground glass filters, cord and connecting plug but without rheostat or carbons..... \$18.00
8683. **RHEOSTATS** for No. 8682, fixed form, 5 amperes.
- | | | |
|----------------|------|-------|
| No. | A | B |
| For volts..... | 110 | 220 |
| Each | 7.00 | 10.00 |
8684. **EXTRA CARBONS** for No. 8682..... each .06
per dozen .60
8685. **DAYLITE GLASS AND ADAPTER**, for No. 8682..... 2.00
8688. **LAMP, Microscope, Miniature Electric**, small but very efficient, measuring 2x2x3½ inches, low enough to work beneath the substage condenser. It is usually used in this position, it then being necessary to swing the mirror of the microscope to one side. The back and base of the lamp are wood, making its use entirely safe for laying on a polished desk or other such surface. The frame is metal, finished with permanent crystal black which is very durable. The bulb is a 15-watt gas-filled, concentrated filament, and may be used directly on any 110-volt circuit, either direct or alternating. It may be used on 220-volt current with Rheostat No. 8691. A metal reflector behind the bulb concentrates the light and no light can escape except through the single opening. The intensity of illumination is ample for the use of 1.8 mm oil immersion objective and 10x ocular. Complete with five feet of cord and attachment plug with bulb, and blue and ground glasses 4.25
8689. **LAMP, Microscope**, same as No. 8688, but with Daylite glass..... 4.75
8690. **EXTRA BULBS** for Nos. 8688 and 8689..... each 1.25
8691. **RHEOSTAT** for use in series with Nos. 8688 and 8689 on 220-volt circuit..... 3.00
8694. **LAMP, Microscope, Spencer No. 370**, adjustable in height and angle, and fitted with standard pear-shaped, gas-filled bulb, usable on any 110-volt circuit. The bulb is used end-on, with a reflector behind it, giving ample illumination for 1.5 mm oil immersion objectives and high power oculars. Very serviceable for illuminating opaque objects and for work with a binocular microscope. Complete with five feet of cord and attachment plug, key socket, and with 75-watt 110-volt blue glass gas-filled Mazda bulb. Finished in durable crystal black.. 9.00
8695. **EXTRA BULB** for No. 8694, 75-watt 110-volt, blue glass..... 1.00
8696. **LAMP, Microscope**, same as No. 8694, but with 100-watt 110-volt blue glass gas-filled Mazda bulb 9.75
8697. **EXTRA BULB** for No. 8696, 100-watt 110-volt, blue glass..... 1.65
8698. **LAMP, Microscope**, same as No. 8694, but with 75-watt 110-volt clear glass gas-filled Mazda bulb, fitted with condenser and with blue and ground glasses..... 10.00
8699. **EXTRA BULB** for No. 8698, 75-watt 110-volt, clear glass..... .90
8700. **LAMP, Microscope**, same as No. 8698, but with 100-watt 110-volt clear glass gas-filled Mazda bulb, fitted with condenser and with blue and ground glasses..... 10.50
9701. **EXTRA BULB** for No. 8700, 100-watt 110-volt, clear glass..... 1.25
8702. **LAMP, Microscope**, same as No. 8700, but with Daylite glass..... 12.50
8703. **RHEOSTAT**, for use with Nos. 8694 and 8698, on 220-volt circuit..... 5.00
8704. **RHEOSTAT**, for use with Nos. 8696, 8700 and 8702, on 220-volt circuit..... 6.00



No. 8708.



No. 8714.



No. 8722.

8708. **LAMP, Microscope, Spencer Quadruple**, for illuminating several microscopes at the same time. It measures 6x6x9 inches, and is entirely constructed of metal, finished with crystal black which is exceedingly durable. It is fitted with a 100-watt 110-volt Mazda gas-filled bulb, adjustable in height. A single lamp will supply illumination with entire satisfaction for four microscopes at a distance of three feet. The top of the lamp house reaches a maximum temperature of about 140°F., serving as a convenient place for drying specimen slides or keeping paraffine fluid. Complete with standard pear-shaped Mazda bulb, five feet of attachment cord, snap switch and plug, four ground and four blue glasses..... **\$10.00**
8709. **LAMP, Microscope**, same as No. 8708, but fitted with four disks of Daylite glass..... **13.00**
8710. **EXTRA BULB** for Nos. 8708-9, 100-watt, 110-volt **1.25**
8711. **RHEOSTAT** for use with Nos. 8708-9, on 220-volt circuit..... **6.00**
8714. **LAMP, Microscope, Spencer High Power Mazda**, designed to meet the demand for a very strong beam of light without the objections incident to an arc. Equipped with a Mazda gas-filled concentrated filament bulb, an independent silvered glass reflector of the proper curve, and a pair of 4½-inch condensing lenses which throw a converging beam of light out through the cone. May be tilted at practically any angle. An excellent instrument for use with the dark field illuminator, and for photomicrography. This apparatus with an attachable section and projection objective, forms a very compact and efficient stereopticon. Complete as described with 250-watt, 110-volt Mazda bulb..... **20.00**
8715. **LAMP, Microscope**, same as No. 8714, but with 400-watt 110-volt Mazda bulb..... **23.00**
8716. **DAYLITE GLASS AND ADAPTER** for Nos. 8714 and 8715..... **2.00**
8717. **RHEOSTAT** for No. 8714, on 220-volt circuit **5.00**
8718. **RHEOSTAT** for No. 8715, on 220-volt circuit..... **6.00**
8719. **EXTRA BULB** for No. 8714, 250-watt, 110-volt **4.00**
8720. **EXTRA BULB** for No. 8715, 400-watt, 110-volt **6.00**
8722. **DISTRIBUTING BOX for Microscope Lamps, Spencer Quadruple**, designed to meet the demand for using several microscope lamps on a single laboratory table from a single incandescent electric extension. Made of metal, fitted with five porcelain sockets. The current is supplied by attaching extension cord and plug to the top socket. It may quickly and easily be removed when the laboratory table is desired for other purposes..... **6.50**
8730. **MICROMETER, Eyepiece**, a glass disk with finely ruled scale to be laid upon the diaphragm of an ordinary Huyghenian eyepiece, with a 5 mm scale divided into 50 parts (to 0.1 mm) **1.50**
8731. **MICROMETER, Eyepiece**, same as No. 8730, but with scale divided into 100 parts (to 0.05 mm) **1.50**
8734. **MICROMETER, Stage**, for standardizing eyepiece micrometers, consisting of a glass object slide with finely ruled scale, 1 mm divided into 100 parts..... **3.00**



8738. **NOSEPIECES, Revolving**, of the circular type, dustproof. They are valuable accessories when the Microscope is supplied with more than one objective, as they save time and prevent damage and loss of objectives. When ordered with the microscope, objectives are so fitted that they are par-focal.

No.	A	B
Style	double	triple
Each	\$4.75	6.75

8746. **OBJECTIVES, Achromatic**, made in accordance with methods first adopted by Professor Abbe by which the complete mathematical formulation of the objective is first perfected, all of its elements clearly determined, such as the actual indices of refraction in the several optical glasses employed, the radii of the curved surfaces, the thicknesses of the lenses and the distances of separation, so that this work of prior calculation does away with all the uncertainties of experimental optics. A greater degree of perfection and a much greater uniformity are thus obtained than it is ever possible to obtain in microscope objectives made in other ways. In these calculations especial consideration is given to securing: flatness of field, critical definition, resolution and long working distance. All objectives are corrected for a tube length of 160 mm and a cover glass thickness of 0.18 mm. Nos. H and J are for oil immersion work.

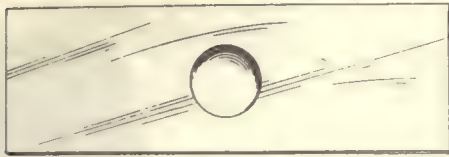
No.	A	B	C	D	E	F	G	H	J
Equivalent focus, mm	48	32	25	16	8	4	4	1.8	1.5
Equivalent focus, about, inches.....	2	1 3/8	1	3/8	1/3	1/6	1/6	1/4	1/6
Numerical aperture ..	0.1	0.1	0.25	0.25	0.5	0.70	0.85	1.25	1.25
Working distance* with 160 mm tube and 10x eyepiece, mm	28	15	9.5	5	1.5	0.6	0.46	0.13	0.10
Diameter of the †real field, mm.....	6.5	4.7	3.3	2.1	1.	....	0.4	0.2	0.14
Each	4.75	4.75	6.00	6.00	9.75	9.75	9.75	32.50	50.00

* Working distance is the distance between the front lens and cover glass.
† Real field is the diameter of the circular area seen through the microscope and measured in the plane of the object.

Magnification Table.
Tube length, 160 mm. Image distance, 250 mm.

Objec- tives mm.	Initial Magnifi- cation	OCULARS								Objec- tives mm.
		4x	5x	6x	8x	10x	12x	15x	20x	
48	2.2	8	11	13	18	22	27	33	44	48
40	2.8	11	14	17	22	28	33	42	56	40
32	4	16	20	24	32	40	48	60	80	32
30-22	2-4.5	4-9	5-12	8-19	10-24	15-35	18-43	20-48	30-70	30-22
25.4	6	24	30	36	48	60	72	90	120	25.4
16	10	40	50	60	80	100	120	150	200	16
12	15	60	75	90	120	150	180	225	300	12
8	20	80	100	120	160	200	240	300	400	8
5	36	144	180	216	288	360	432	540	720	5
4	44	176	220	264	352	440	528	660	880	4
3	60	240	300	360	480	600	720	900	1200	3
1.8	95	380	475	570	760	950	1140	1425	1900	1.8
1.5	109	436	545	654	872	1090	1308	1635	2180	1.5

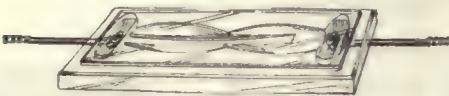
8760. **SLIDES, Microscope, medium thick**, 75x25 mm (3x1 inch), made of the best American half-white glass, with ground edges, in boxes of 1/2 gross.....per gross 1.50
8762. **SLIDES, Microscope**, same as No. 8760, but 75x50 mm, (3x2 inches).....per gross 2.00
8764. **SLIDES, Microscope, extra thin**, 75x25 mm (3x1 inch), of white glass.....per gross 1.90



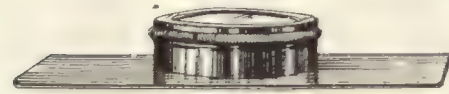
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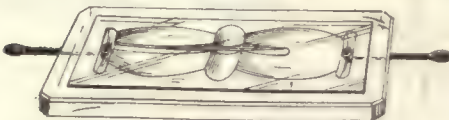
No. 8776.



No. 8780.



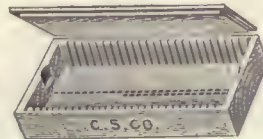
No. 8784.



No. 8788.



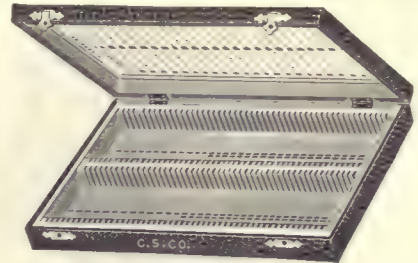
No. 8792.



No. 8798.



No. 8802.



No. 8804.



No. 8810.

8768. **SLIDES**, Microscope, concave center, 75x25 mm (3x1 inch).....per dozen \$0.90
8776. **SLIDE**, Drop Culture or Hanging Drop Slide, 75x25 mm (3x1 inch), with spherical cavity 22 mm in diameter by 3 mm deep, ground in polished plate glass..... .30
8780. **SLIDE**, Current, Holman's. A plate glass slip, with two oval cells connected by a very shallow channel. In use, the cells are partly filled with blood and covered by a thin cover glass. By bringing the finger near one of the cavities, the air is caused to expand and drive the blood through the channel where it may be observed under very favorable conditions. Complete with cover..... 2.00
8784. **SLIDE**, Life Box, consisting of two glass plates, one on a metal slip, the other adjusted to it by a sliding sleeve. For examining organisms in fluid. Diameter of cell, 25 mm; maximum depth, 8 mm; slip 32x80 mm..... 2.50
8788. **SLIDE**, Siphon, Holman's. Consists of a thick plate glass slip with two shallow oval cavities and a deep groove to hold a small fish or similar object and retain it without undue pressure in a fixed position. Small metallic tubes communicate with the extremity of the deep groove. By means of these tubes water may be siphoned through the slide thus keeping the water supply continuously renewed and enabling the object to be kept under observation for long periods of time. Complete with cover..... 6.00
8792. **SLIDE MOUNTING CELLS**, Glass. Rings with finely ground edges, for cementing on microscope slides to make cells. No. A B C D E
 Diameter, mm..... 15 18 18 22 24
 Height, mm..... 3 5 10 9 10
 Each15 .15 .15 .15 .15
8794. **SLIDE MOUNTING CELLS**, Hard Rubber, similar to No. 8792, furnished in depths from 0.5 to 3 mm. Diameter, mm..... 13 16 19 22
 Each06 .06 .07 .07
- In ordering kindly specify depth as well as diameter.
8798. **SLIDE BOXES**, of white wood, with covers fitting inside, so arranged that when removed the ends of the slides are exposed so that they can be easily removed. Grooved to hold 25 objects, numbered and indexed.....per dozen .90
8799. **SLIDE BOXES**, same as No. 8798, but grooved to hold 12 slides numbered and indexed. per dozen..... .95
8802. **SLIDE BOXES**, of white wood with covers closely fitting outside, grooved to hold 25 objects, numbered and indexed.....per dozen 1.10
8804. **SLIDE BOXES**, grooved to hold 100 slides, cloth covered, with hinged cover and catch, each .50
8810. **SLIDE CABINET**, Minot's Metal, very compact, occupying much less space than a wooden cabinet and affording much better protection against fire. It is strongly made of metal throughout, neatly finished on the outside in maroon-colored japan with bronze stripes. The inside finish is in black japan. It contains 30 japanned metal trays, each holding 24 glass slides, 75x25 mm. The trays are provided with convenient knobs and with card-holders. The cabinet is furnished with a good brass lock and measures 36.3 cm in height, 32.5 cm in depth and 17.5 cm in width, outside. Complete with 30 trays..... 25.00



- No. 8816. SLIDE COVER GLASSES**, made of the best white glass, uniform in thickness, put up in boxes of $\frac{1}{2}$ ounce each.

Shape.	*Thickness			Dimensions.	Price Per oz.
	No.	mm.	inches		
Squares	1	0.13-0.17	$\frac{1}{200}$ - $\frac{1}{150}$	In ordering	1.20
Squares	2	0.17-0.25	$\frac{1}{150}$ - $\frac{1}{100}$	specify size desired,	1.05
Squares	3	0.25-0.50	$\frac{1}{100}$ - $\frac{1}{50}$	whether 15 mm.	1.00
Circles	1	0.13-0.17	$\frac{1}{200}$ - $\frac{1}{150}$	($\frac{5}{8}$ "), 18 mm ($\frac{3}{4}$ "),	1.50
Circles	2	0.17-0.25	$\frac{1}{150}$ - $\frac{1}{100}$	22 mm ($\frac{7}{8}$ "), or	1.35
Circles	3	0.25-0.50	$\frac{1}{100}$ - $\frac{1}{50}$	25 mm (1").	1.30
Rectangular	2	0.17-0.25	$\frac{1}{150}$ - $\frac{1}{100}$	22x40 mm (65=1 oz)	1.50
Rectangular	2	0.17-0.25	$\frac{1}{150}$ - $\frac{1}{100}$	22x50 mm (60=1 oz.)	1.50

Approximate Number of Covers Per Ounce.

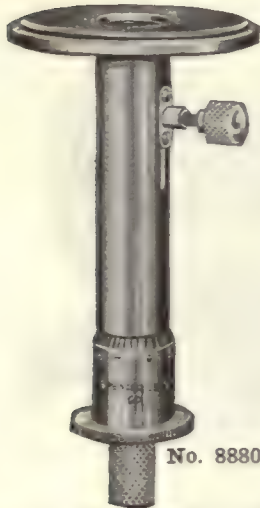
Squares	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	Circles	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"
No. 1	296	206	150	116	No. 1	362	280	182	142
No. 2	234	162	120	92	No. 2	286	195	157	112
No. 3	196	136	100	76	No. 3	240	166	122	93

SLIDE HOLDERS, see **Staining Dishes**.

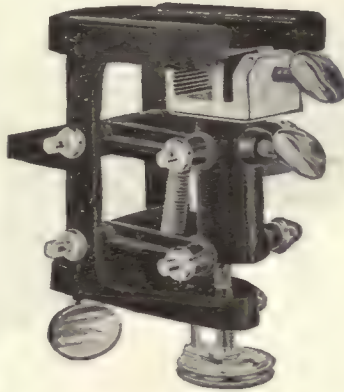
- 8818. SLIDE HOLDER, Basket Form**, of nicked brass, for use in staining a number of slides simultaneously. Capacity, 12 slides, placed back to back. 1.00
- 8820. SLIDE HOLDER, Multiplex**, designed by E. F. Miller of the University of California. Consists of a series of hard rubber plates sliding on rods, which can be clamped together by means of a knurled thumb screw. Will take any number of slides up to 26, and can be used in any kind of jar or receptacle. 2.00
- 8176. SLIDE LABELS** for glass slides, 22 mm square, in boxes of 100. per box .10
- 8178. SLIDE LABELS**, for glass slides, 22x15 mm, in boxes of 100. per box .10
- 8832. SLIDE MAILING CASES**, of wood, consisting of top, middle and bottom sections, for stacking.
- | No. | A | B | C |
|-----------|-----|--------|--------|
| Section | top | middle | bottom |
| Per dozen | .10 | .10 | .10 |
- 8836. SLIDE TRAYS**, map form, to hold 14 slides. each .30
- 8838. SLIDE TRAYS**, map form, to hold 20 slides. each .35
- 8852. STAGE, Warm, Electrically Heated**, for use with any microscope to keep the stage constantly at blood heat or other temperature. With this Warm Stage, micro-organisms may be observed under the microscope in the temperature of their natural habitat. Consists of a circular disk $3\frac{1}{2}$ inches in diameter by $\frac{1}{2}$ inch thick; with heating element, thermometer, and electro-thermostat, which can be adjusted to maintain any desired temperature on the top of the disk. The disk has a $\frac{3}{4}$ -inch hole in the center, over which the regular microscope slide may be placed. Complete with cord and special plug for attachment to any 110-volt lamp socket. 12.00
- 8858. TURN TABLE** for ringing mounts. The slide is held on a revolving disk; the application of cement or varnish is accurately made by a brush held above; with self-centering device, detachable hand-rest and clips for holding down slides. Diameter of turn table, 88 mm. 5.00
- 8862. WARMING TABLE**, of copper plate, for drying and mounting. Length, 350 mm; width, 100 mm; height, 213 mm. 1.75



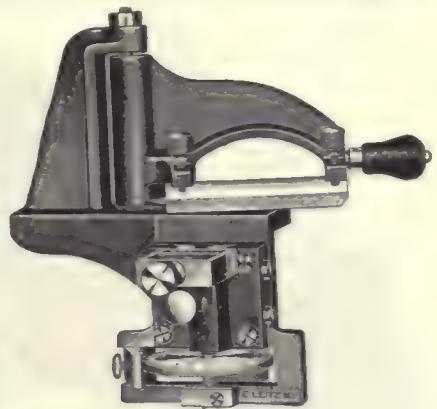
No. 8864.



No. 8880.



No. 8884.



No. 8892.

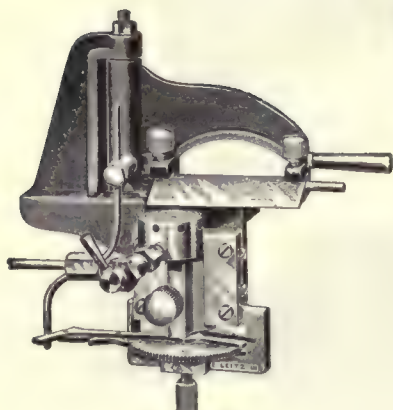


No. 8966.

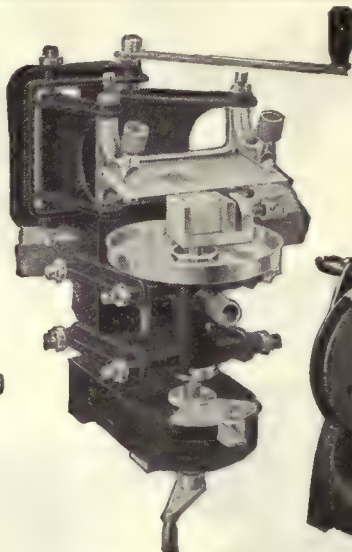
8864. **WARMING TABLE, Electrically Heated and Regulated**, for warming slides in mounting paraffine sections. Can also be used in fixing and hot staining. Constructed of a block of transite 24 inches long and 6 inches wide, mounted on a metal frame 3 inches high. A series of resistance coils embedded in the transite furnishes the heat, the degree of which is controlled by a thermo-regulator adjusted by a small knurled head at the side. A pilot lamp indicates when the current is on and off. Any temperature can be obtained from 30° to 70°C. Shipping weight, 33 pounds. Complete with metal hood to protect slides from dust, thermometer, connecting cord and plug for attachment to any 110-volt lamp socket..... \$35.00

MICROTOMES AND ACCESSORIES

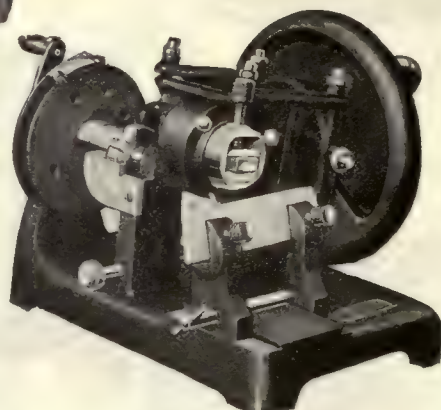
8880. **MICROTOME, Hand**, intended for rapid class work or where expense is the chief consideration. The object is placed in a clamp in the upper end of the tube, and is raised through the hole in the glass plate by an accurately cut screw, which is entirely enclosed and protected from dust and injury. The feed is accurate and finely graduated. Each division represents 10 microns. The plate at the top over which the knife is drawn is 3 inches in diameter, making a firm support for the knife..... **without knife 7.50**
8884. **MICROTOME, Table**, for all kinds of sectioning, including the freezing method. The object clamp is placed in a vertically movable socket, held by hardened steel pivot screws in two vertically swinging arms which are similarly attached to the main frame. The movement thus provided for is regulated by a micrometer screw, with graduated disk and index plate. The finest feed is $2\frac{1}{4}$ microns. The knife travels on glass plates set in grooves in the metal. These plates are extra long, so that the microtome knife will not be drawn off from the ends, thereby endangering its edge. When equipped with a freezing attachment, it makes a very satisfactory microtome for frozen section work. (See Nos. 8885 and 8886.) **Without knife 15.00**
8885. **MICROTOME, Table**, same as No. 8884, but with No. 8940 Freezing Attachment for Carbon Dioxide **25.00**
8886. **MICROTOME, Table**, same as No. 8884, but with No. 8942 Freezing Attachment for Ether **22.50**
8906. **MICROTOME KNIFE**, chisel blade form, with 88 mm cutting edge, for use especially on Nos. 8884 to 8886..... **4.00**
8892. **MICROTOME, Clinical and Diagnostic, for Hand Feed**, provided with micrometer screw with graduated or toothed head, each division representing 5 microns of feed. The hinged arm carrying the knife is held rigidly in line by the solid metal frame preventing an uneven or inaccurate cut. Complete with object clamp to take paraffine blocks up to 30x22 mm, but **without knife..... 19.50**
8894. **MICROTOME, Clinical and Diagnostic, for Hand Feed**, same as No. 8892, but with freezing chamber for carbon dioxide with needle valve to control the flow of gas. Will take objects up to 30 mm in diameter..... **without knife or object clamp 24.50**
8896. **MICROTOME, Clinical and Diagnostic, for Hand Feed**, same as No. 8894, but with both paraffine clamp and freezing chamber for carbon dioxide..... **without knife 26.50**
8897. **KNIFE FOR PARAFFINE SECTIONS**, for use with Nos. 8892 and 8896, with 80 mm cutting edge **5.00**
8898. **KNIFE for Frozen Sections**, for use with Nos. 8894 and 8896, with 80 mm cutting edge.. **5.00**



No. 8904.

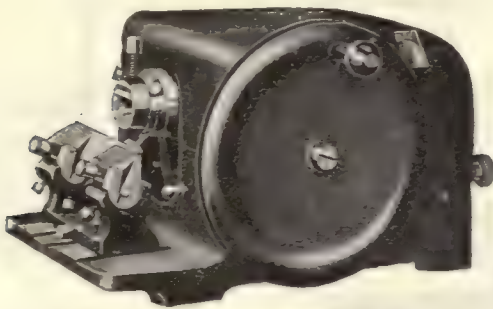


No. 8910.

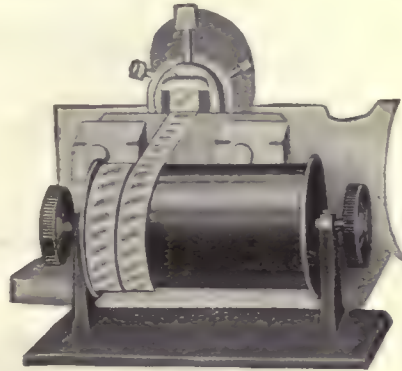


No. 8918.

8902. **MICROTOME, Clinical and Diagnostic, with Automatic Feed**, similar in construction to No. 8892, but with automatic device for moving the feed screw as the knife is returned for the next stroke. Complete with object clamp for paraffine blocks up to 30x22 mm, but **without knife** \$35.00
8904. **MICROTOME, Clinical and Diagnostic, with Automatic Feed**, same as No. 8902, but with freezing chamber for carbon dioxide.....**without knife or object clamp** 40.00
8906. **MICROTOME, Clinical and Diagnostic, with Automatic Feed**, same as No. 8902, but with both paraffine clamp and freezing chamber for carbon dioxide.....**without knife** 42.00
- KNIVES** for Nos. 8902, 8904 and 8906, see Nos. 8897 and 8898.
8910. **MICROTOME, Automatic Laboratory**, designed to do away with all sliding parts. The feed mechanism is automatic, simple in construction, covered and protected from dust and drippings. The microtome may be securely clamped to any laboratory table. It may be set to cut sections of any desired thickness. Each division of the graduated scale marks 5 microns. The extreme ends of the knife rest in carrier, and, as the lever handle moves the swinging arms, the knife describes a flattened curve, corresponding to the double movement in free-hand sectioning. By this manner of holding the knife by arms which are not parallel, the entire length of its cutting edge is utilized, insuring uniform wear and permitting the cutting of very large sections. This peculiar motion of the knife makes this microtome pre-eminently fitted for cutting frozen sections. Complete with one knife and usual object clamp for paraffine or celloidin, in case..... 60.00
8912. **MICROTOME, Automatic Laboratory**, same as No. 8910, but fitted with No. 8940 Freezing Attachment for Carbon Dioxide..... 70.00
8914. **MICROTOME, Automatic Laboratory**, same as No. 8910, but fitted with No. 8942 Freezing Attachment for Ether..... 67.50
- For **KNIVES** for Nos. 8910 to 8914, see No. 8958B.
8918. **MICROTOME, Spencer Simplified Rotary**, designed to meet the demand for a dependable instrument of precision at a moderate price. A high degree of accuracy is attained by following the same principle of construction which is used in the Spencer Rotary Microtome No. 8922. The feed mechanism is independent of the up-and-down movement of the object. It is operated by a micrometer screw, cut two threads to the millimeter, to which is fastened a wheel having 250 notches cut on its periphery. Each notch represents a thickness of two microns in the section. The instrument will cut any thickness up to forty microns in multiples of two. The total excursion of the feed is 30 mm. A crank provides a means for adjusting the object to the knife with extreme delicacy and also for returning the object clamp to the position necessary for starting a new series of sections. When the clamp has reached the extreme forward position, the feed mechanism automatically ceases to work.
- The object clamp holder is moved up and down at the ends of two parallel hinged arms entirely independent of the feed mechanism. The clamp may be rotated on its axis by loosening one of the screws. It regularly takes in a block 28 mm wide and 16 mm thick. There is a provision by which the latter dimension may be increased to 22 mm.
- The whole instrument is rigidly made and runs extremely easily and quietly. It is finished in crystal black and is supplied in a substantial case. Complete with one No. 8958B Knife with handle and back for sharpening, and with three object disks..... 75.00



No. 8922.



No. 8925.

8922. **MICROTOME, Spencer Rotary**, intended for the most accurate and careful work. An inclined plane feed, which is independent of the up-and-down movement on the perpendicular support, overcomes the inaccuracies inherent in other rotary microtomes. The provision of an accurate and reliable feed mechanism, combined with the utmost rigidity of parts, make this instrument the most precise and accurate for laboratory or research work. Sections may be cut of any definite thickness, each section having the same thickness.

The feed mechanism is composed of a rigid bearing, on which the feed block is moved by an accurate screw, cut with two threads to the millimeter; it is revolved by a ratchet feed wheel with 250 teeth; each tooth represents therefore a movement forward of the object of one micron. The feed is so arranged that it can be set for sections of any thickness, from 1 micron to 60 microns, by turning the knurled button at the back of the case until the number representing the desired thickness appears opposite the indicator at the small opening in the side of the case near the balance wheel. The total excursion of the feed is 37 mm, allowing a sufficient range for cutting a complete series of a very large object without the necessity of a break due to resetting the knife and feed mechanism.

The up-and-down stroke of the object clamp is 50 mm which permits the cutting of very large sections and gives sufficient stroke for celloidin cutting. The clamp may be held at its upper limit for orienting or trimming the block by pushing in a pin. The object may easily be rotated.

The knife is fastened by two clamps, each of which clamps the knife at the back and along $1\frac{1}{4}$ inches of the edge as well. It may be turned to any desired angle, and the clamps may also be moved toward one another to bring them as near to the ribbon as desired to gain additional rigidity. When the clamps are thus drawn together, the knife may be moved so that practically all of the cutting edge can be used before the necessity of resharpener. The adjustment screws provide for knives of different widths. The whole knife support is adjustable to and from the object, and is very easily and conveniently clamped in any location by a lever connected with an eccentric cam.

The whole of the feeding mechanism is covered, protecting the wearing parts from dust and presenting a very neat appearance. The top of the case is hinged to the lower part, permitting it to be easily opened. The balance wheel is grooved, so that the instrument may be run by a motor. The whole microtome is finished in crystal black, alcohol-proof enamel. The smaller parts are heavily nickel-plated.

When desired, the microtome is provided with an adjustable knife support which is especially adapted to celloidin sections. The knife holder of this support is adjustable from a horizontal position through 55° upward. Complete with one knife, handle and back for sharpening, and with three object disks..... \$130.00

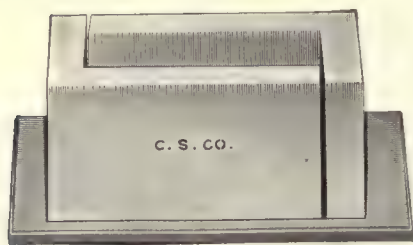
8923. **KNIFE HOLDER** for No. 8922, for celloidin sections 15.00

8924. **KNIFE HOLDER, Adjustable**, for No. 8922, permitting the entire block carrying the knife to be shifted $1\frac{1}{2}$ inches either way from center 10.00

8925. **RIBBON CARRIER, Spencer Cylindrical**, for use with No. 8922, consisting of an aluminum cylinder mounted in an aluminum frame, under the base of which are small rollers, rolling in the direction of the long dimension of the frame. The end of the ribbon adheres to the cylinder, which is slightly turned by the knurled heads shown in the illustration as the ribbon lengthens. At the same time, the cylinder and frame are gently pushed forward on the rollers to place the ribbon on the cylinder in a long spiral. The cylinder has flanges at the ends so that when it is removed from its bearings and placed on a sheet of paper on the table, the sections of the ribbon are not injured. When in this position each turn of the spiral may be cut and one turn after another, each approximately 8 inches long, may be spread out in order on the paper. The cylinder is $4\frac{1}{2}$ inches long, $2\frac{3}{4}$ inches in diameter, and mounted so as to bring it as close as possible to the microtome knife..... 8.00

8926. **TABLE** for No. 8922, complete with motor and speed regulator, all enclosed. Length, 38 inches; width, 26 inches; oak finish.

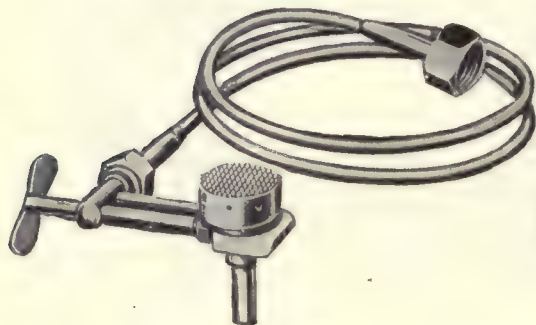
No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	80.00	98.75	75.00	93.75



No. 8934.



No. 8936.



No. 8940.



No. 8942.

MICROTOME ACCESSORIES

8932. **BLOCKS, Red Fiber**, for holding specimens for sectioning.
- | No. | A | B | C | D |
|--------------------|---|---|---|---------------------------------|
| Size, inches | $\frac{1}{2} \times \frac{1}{2} \times \frac{3}{4}$ | $\frac{5}{8} \times \frac{5}{8} \times \frac{3}{4}$ | $\frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$ | $1 \times 1 \times \frac{3}{4}$ |
| Per 100 | \$3.00 | 4.00 | 5.25 | 8.25 |
8934. **EMBEDDING BOX for Paraffine**, consisting of two angle pieces of metal with a metal plate.
- | No. | A | B | C |
|------------------|-----|-----|-----|
| Height, mm | 10 | 20 | 30 |
| Each | .75 | .75 | .75 |
8936. **EMBEDDING TABLE for Paraffine**, of copper, 400 mm long and 190 mm wide tapering to a point. With removable legs, 213 mm high..... 2.00
8940. **FREEZING ATTACHMENT for Carbon Dioxide**, for Nos. 8884 and 8910 Microtomes. Substantially made, easy to operate, and exceedingly efficient. A hard rubber non-conducting ring between the corrugated plate, to which the object is frozen, and the rest of the apparatus, prevents the conduction of cold away from the specimen, thus saving time and gas. The chamber is provided with a pin like that on the object clamp, which fits into the same socket on the microtome. The chamber is connected with the CO₂ cylinder by a flexible copper tube. In operating, the valve at the chamber should first be closed and the valve at the cylinder slightly opened, to admit the gas into the tube. Then, by opening and closing the small valve at the chamber three or four times in quick succession, the tissue is frozen without any waste of gas and without any inconvenience caused by the freezing up of the chamber or the connections. By this method a section may be cut, stained and mounted ready for examination in one and one-half minutes from the time the tissue is put on the chamber. Complete with copper tube connections..... 10.00
8942. **FREEZING ATTACHMENT for Ether**. Consists of a freezing chamber of hard rubber which so prevents the radiation of the cold that the tissue is quickly frozen. It will freeze tissue 15 mm in diameter and 3 mm thick in one minute, using only 5 cc of ether. The ether is held in the metal tank, which for filling may be unscrewed from the support from which it is suspended. Any excess of ether which does not evaporate is drained back into the metal chamber from which it came. There are no bottles or entangling tubes and no waste of ether. It is simple, compact and efficient. It can be used on any sliding microtome, such as Nos. 8884 and 8910..... 7.50
8948. **HONE, Ezy Edge**, $5\frac{1}{4}$ inches long by 2 inches wide, a fast, smooth-cutting hone, combining the sharpness of an artificial hone with the softness of the Belgian. With directions for use .75
8950. **HONE, Blue-Green**, with small rubbing block, 6 inches long..... .20
8952. **PALM OIL SOAP** for use with Nos. 8948 and 8950.....per cake .15



Nos. 8958, 8961 and 8962.



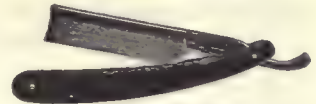
No. 8968.



No. 8966.



No. 8992.



No. 8978.



No. 8994.

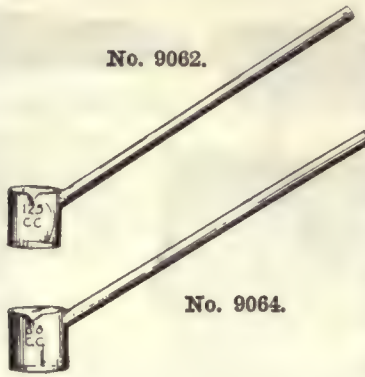
8958. **KNIVES, Microtome**, of selected steel, so ground and tempered as to produce an edge which is not brittle and at the same time is hard enough and tough enough to retain its keenness. Comparatively easy to sharpen; evenly tempered; broad and heavy. Without handle or back, in velvet case. No. A B C D
Cutting edge, mm. 50 110 185 250
Each \$4.50 6.00 10.00 15.00
8960. **KNIVES, Microtome**, similar to No. 8958, but designed specially for use with Microtome No. 8922. Length of cutting edge, 110 mm. Without handle or back; in velvet lined case. No. A B
For sections celloidin paraffine
Each 7.00 7.00
8961. **HANDLE, Ebonized**, for use in sharpening Nos. 8958 and 8960 Microtome Knives. The handle is provided with steady-pins to hold it in proper position, while the handle-rod is threaded to engage directly with the corresponding thread cut in the knife, and is tightened by means of a milled head. The metal parts are finely nickel-plated. 1.00
8962. **HONING BACK** for No. 8958B Microtome Knife, to be used in order that the knife may rest upon the honing stone at the proper angle when being sharpened. Polished and nickel-plated 1.00
8963. **HONING BACK** for No. 8960 Knives. 1.00
8966. **KNIFE, Microtome, Chisel Blade**, for use on the table microtome, especially where a freezing chamber is used. Cutting edge, 88 mm. The handle is of such size and shape that the knife may be easily held in the desired position. 4.00
8968. **KNIFE HOLDER for Safety Razor Blades**, of brass, nickel-plated, for use on any microtome which has a knife clamp. The thin edge of the blade projects beyond the upper edge of the holder just enough to keep it as rigid as possible, and at the same time far enough to allow the specimen to pass by the holder after cutting the section. 4.00
8972. **PITH**, for use in cutting sections; in sticks about 100 mm in length and 6 to 12 mm in diameter; in packages of about 50 grams. per package .10
8978. **RAZOR, Section**, folding handle, best quality; one side of blade flat, the other side concave; straight edge, hard rubber handle; length of blade, 80 mm. In case. 2.30
8986. **STROP, Microtome Knife**, consisting of a flat strip of wood with handle, on the sides of which are cemented pieces of leather 1 $\frac{3}{4}$ by 11 inches long. One side has been treated with carborundum powder, the other is left smooth for finishing. 1.25
8987. **STROP, Microtome Knife**, similar to No. 8986, but with leather on one side only which has been treated with carborundum. Dimensions, 2 $\frac{1}{4}$ x15 inches. 1.50
8988. **STROP, Microtome Knife**, same as No. 8987, but covered with best shell butt horsehide. 2.25
8992. **STROP, Razor**, 21x2 inches, of double Russian red leather, with India filled back, corrugated with nickel-plated swivel and handle. 1.00
8994. **STROPS, Razor, Emerson's**, of calf-skin, specially selected for use with microtome knives and section razors. No. A B
Length, inches. 13 $\frac{1}{2}$ 17 $\frac{1}{2}$
Each 1.00 2.00
8996. **DRESSING for strops**. per box .20



Nos. 9050 and 9052.

No. No.
9056. 9058.

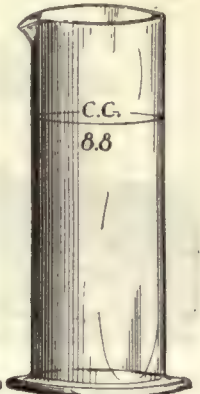
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No. 9064.



No. 9066.



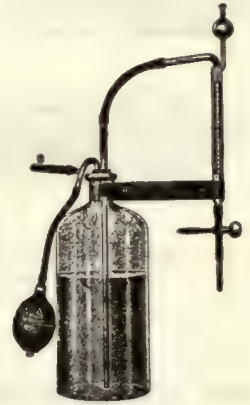
No. 9068.



No. 9072.



No. 9076.



No. 9078.

MILK AND BUTTER TESTING APPARATUS

(Arranged Alphabetically.)

9050. **ACID BOTTLE, Combined.** By tipping the bottle forward and then letting it come back to upright position, the pipette will fill with 17.5 cc of acid. \$5.00
9052. **ACID BOTTLE TRUNNION,** convenient for handling No. 9050 Acid Bottle. Base is of wood covered with lead, which is not acted on by sulphuric acid. Bottle automatically returns to position after tipping. 2.00
9056. **ACID BURETTES.** No. A B C D
 Number of charges of 17.5 cc. 3 6 12 25
 Each 2.25 2.50 2.70 3.35
9058. **ACID BURETTES.** No. A B C
 Number of charges of 8.8 cc. 6 12 25
 Each 2.50 2.70 3.35
9062. **ACID DIPPER, Nafis' Style, 17.5 cc.** .40
9064. **ACID DIPPER, Nafis' Style, 8.8 cc.** .40
9066. **ACID MEASURE, cylindrical jar with lip, 17.5 cc** .15
9068. **ACID MEASURE, cylindrical jar with lip, 8.8 cc** .15
9072. **ACID PIPETTE, Automatic, Farrington's,** consisting of a two-neck Woulff bottle, one neck being fitted with a No. 10461 Automatic Pipette, delivering 17.6 cc; the other neck a No. 1382 Double Rubber Bulb. complete 5.50
- ACID, Sulphuric for Milk Testing.** Prices quoted upon application.
9076. **ACID TESTER, Marschall,** for the accurate determination of the acidity of milk, cream and whey. Exceedingly simple, and equally valuable for the beginner and the expert. Considered a necessity by all first-class butter and cheese makers. Complete with combined burette and bottle for neutralizer, 9 cc pipette, bottle of indicator, and half gallon bottle of neutralizer 8.50
9078. **ACID TESTER, Nafis',** automatic, easy to manipulate, and self-adjusting. The liquid instantly readjusts itself to zero, so that the only reading to be taken in using the apparatus is at the point on the graduated scale where the liquid surface is located after the sample is neutralized. Complete as illustrated, with neutralizer, 9 cc pipette, stirring rod, beaker, 2 ounce bottle of indicator and full directions. 5.50



No. 9088.



No. 9094.



No. 9080.



No. 9092.



No. 9104.



No. 9108.



No. 9130



No. 560.



No. 9095.

9080. **STIRRING ROD**, Nafis' Faultless, for use in acidity tests. This rod is hollow and contains a piece of wool of the exact color which the sample of milk should have when the acidity test is complete \$0.18

ACIDOMETER, see general heading **Hydrometers**.

APRONS, see general heading **Aprons**.

9084. **ALKALINE TABLETS**, Farrington's, for use in determining the degree of acidity of milk, cream, or whey Per box of 50 tablets .25

560. **BALANCE**, Cream, Wisconsin Hydrostatic, devised to meet the demand for a simple and correct method of weighing cream into test bottles. It consists of a specially devised brass float, which is placed in a cylinder of water. The instrument is weighted so as to float in a vertical position, and has at the top a small pan on which a cream bottle and a 9-gram weight are placed. By means of an adjustable pin point, the point to which the float sinks in water is readily marked. The 9-gram weight is then taken from the pan and the cream to be tested is weighed by dropping it slowly into the bottle with a pipette until the float sinks to the same point it reached with the weight on the pan, when the test bottle will contain exactly 9 grams of cream. Very accurate weighings can be made with this instrument and as there are no bearings to rust it will retain its sensitiveness indefinitely. Complete with metal cylinder, float, and 9-gram weight, but without bottle..... 5.50

For other **BALANCES** for Milk and Cream Testing, see general heading **Balances**.

9088. **BOTTLES**, Aluminum Screw Cap, for holding samples of cream. With cork washer. One ounce capacity Per dozen .90

9092. **BOTTLE**, Butter Test, Illinois pattern, a 9 inch bottle for testing 9 gram samples of butter. The neck is graduated for reading up to 90 per cent., and the results obtained compare very favorably with those obtained by chemical analysis..... .50

9094. **BOTTLES**, Milk Jars, for composite tests, made of flint glass; will stand much hard usage.

Capacity, pints	1/2	1	2
Per dozen	1.00	1.30	1.60

9095. **CAPS**, Tin, for No. 9094 Milk Jars. Will fit either size, and keep out dirt and impurities.

..... Per dozen .30

BOTTLES, MILK AND CREAM TEST, ORDINARY GRADE

9102. **BOTTLE**, Milk Test, 6 inch, 18 gram, 8 per cent. Graduated to 1/10 per cent.20
9104. **BOTTLE**, Milk Test, 6 inch, 18 gram, 10 per cent. Graduated to 2/10 per cent.20
9108. **BOTTLE**, Cream Test, 6 inch, 18 gram, 30 per cent. Graduated to 1/2 per cent.25
9110. **BOTTLE**, Cream Test, 6 inch, 18 gram, 40 per cent. Graduated to 1 per cent.25
9112. **BOTTLE**, Cream Test, 6 inch, 18 gram, 50 per cent. Graduated to 1 per cent.25
9114. **BOTTLE**, Cream Test, 6 inch, 9 gram, 50 per cent. Graduated to 1/2 per cent. Direct reading.30
9120. **BOTTLE**, Cream Test, 9 inch, 18 gram, 30 per cent. Graduated to 2/10 per cent.40
9122. **BOTTLE**, Cream Test, 9 inch, 18 gram, 50 per cent. Graduated to 1/2 per cent.40
9124. **BOTTLE**, Cream Test, 9 inch, 18 gram, 55 per cent. Graduated to 1/2 per cent.40
9126. **BOTTLE**, Cream Test, 9 inch, 18 gram, 100 per cent. Graduated to 1 per cent.60

NOTE: Nine inch Cream Test Bottles are too long for regular Babcock Testers. See No. 9206 Cream Tester.

9130. **BOTTLE**, Skim Milk, Perfect, 6 inch. Graduated to 1/100 per cent.70



BOTTLES, MILK AND CREAM TEST, STANDARD

The following bottles (Nos. 9136 to 9142) are made in accordance with the specifications formulated by the Bureau of Standards, Washington, D. C., and adopted by the Official Dairy Instructors' Association, and by the State of Indiana.

- 9136. **BOTTLE, Milk Test, Standard, 6-inch, 18-gram, 8 per cent.** Graduated to $\frac{1}{10}$ per cent.. \$0.30
 - 9140. **BOTTLE, Cream Test, Standard, 6-inch, 9-gram, 50 per cent.** Graduated to $\frac{1}{2}$ per cent.. .33
 - 9142. **BOTTLE, Cream Test, Standard, 9-inch, 9-gram, 50 per cent.** Graduated to $\frac{1}{2}$ per cent.. .40
- The following bottles (Nos. 9146 to 9160) are made in accordance with the specifications formulated by the Dairy and Food Commission, Madison, Wis.
- 9146. **BOTTLE, Milk Test, Standard, 6-inch, 18-gram, 10 per cent.** Graduated to $\frac{2}{10}$ per cent.. .22
 - 9150. **BOTTLE, Cream Test, Standard, 6-inch, 18-gram, 30 per cent.** Graduated to $\frac{1}{2}$ per cent.. .33
 - 9152. **BOTTLE, Cream Test, Standard, 6-inch, 18-gram, 40 per cent.** Graduated to $\frac{1}{2}$ per cent.. .33
 - 9154. **BOTTLE, Cream Test, Standard, 7½-inch, 18-gram, 50 per cent.** Graduated to $\frac{1}{2}$ per cent .40
 - 9156. **BOTTLE, Cream Test, Standard, 9-inch, 18-gram, 30 per cent.** Graduated to $\frac{2}{10}$ per cent. .40
 - 9160. **BOTTLE, Cream Test, Standard, 9-inch, 18-gram, 50 per cent.** Graduated to $\frac{1}{2}$ per cent.. .40
- BRUSHES** for cleaning Milk and Cream Test Bottles, see general heading **Brushes**.
BRUSH for cleaning Milk Jars, see **Brushes**.

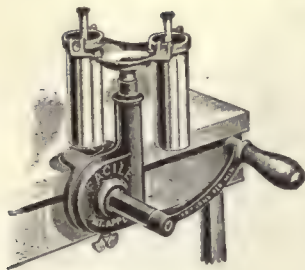
3848.	CAPSULES , of lead (tin) foil for milk analysis. No.	A	B	C
	Size, inches.....	2¾x¾	2½x1½	3½x½
	Per 100	2.50	2.50	2.50

For other **CAPSULES**, see general heading **Capsules**.

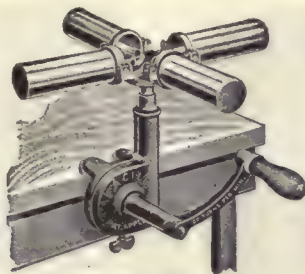
- 9170. **CASEIN TUBE, Hart's**, for estimating amount of casein in milk. To be used in any Babcock Milk Tester40
 - 9172. **CATALASE APPARATUS**, for determining the presence and relative amount of catalase in milk, with measuring arm graduated from 0 to 13 cc in $\frac{1}{10}$ cc divisions. Complete with tube for holding sample, one-hole rubber stopper and glass rod to close hole in stopper.. 3.00
 - 9173. **CHARTS, Milk Record**, for one week's record of 15 cows, with spaces for both morning and afternoon production, in pounds and tenths..... per hundred 1.00
 - 9174. **CHURNS, Dazey**, for family and experimental use. Jars are of glass, so that process can be watched, and are made square to prevent racing of cream and to give double agitation. With aluminum-coated castings, heavily nickeled cap, hardwood turbine dasher, heavily tin-plated dash rod, smooth-running gears, with directions for use. No.
- | | | | |
|-------------------------------|------|------|------|
| | A | B | C |
| Total capacity, pints..... | 5 | 7½ | 9 |
| Churning capacity, pints..... | 2½ | 3¾ | 4½ |
| Each | 1.75 | 2.25 | 2.75 |
- 3850. **DISHES, Milk**, of aluminum, flat bottom, straight sides.
- | | | | | |
|-----------------------|-----|-----|-----|-----|
| No. | A | B | C | D |
| Diameter, inches..... | 2 | 2½ | 3 | 4 |
| Height, inches..... | ½ | ¾ | ¾ | 1 |
| Each | .20 | .30 | .36 | .40 |

For other **DISHES**, see general headings **Capsules; Dishes, Evaporating; etc.**

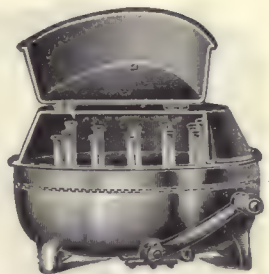
- 4192. **DIVIDERS, Plain Brass**, for reading graduations on test bottles. Length 4½ inches.... .60
 - 5254. **FAT EXTRACTION TUBE, Roehrig**, for the determination of fat in milk and milk products, by the Roese-Gottlieb method, adopted as standard by the Association of Official Agricultural Chemists 4.50
- HYDROMETERS**, see general heading **Hydrometers**.
HYDROMETER JARS, see general heading **Cylinders**.
JARS, Sample, see general heading **Jars**.
LACTOMETERS, see general heading **Hydrometers**.



No. 9194.



No. 9200.



No. 9204D.



Nos. 9210-11.



Nos. 8214-15.

9194. **MILK TESTER, Babcock, for hand power**, with enclosed cut steel spiral gears which run in grease without noise. A clamp is provided for attaching to any table. With seamless brass pockets firmly secured, of the proper depth to contain hot water to submerge the bottles. Complete with two 6 inch, 18 gram, 10 per cent. milk test bottles; one 17.6 cc pipette; one 17.5 cc acid measure; one test bottle brush, and full directions for use \$6.50

9196. **MILK AND CREAM TESTER, Babcock, for hand power**, same as No. 9194, but with two 6 inch, 18 gram, 10 per cent. milk test bottles; two 6 inch, 18 gram, 30 per cent. cream test bottles; one combined 17.6-18 cc pipette; one 17.5 cc acid measure; one test bottle brush, and full directions for use 7.15

9200. **MILK AND CREAM TESTER, Babcock, for hand power**, same as No. 9194, but four bottle size. Complete with four 6 inch, 18 gram, 10 per cent. milk test bottles; two 6 inch, 18 gram, 30 per cent. cream test bottles; one combined 17.6-18 cc pipette; one 17.5 cc acid measure; one test bottle brush, and full directions for use..... 8.50

9204. **MILK TESTERS, Babcock, for hand power**, with solid iron case and hinged cover, cut steel spiral and spur gears and seamless brass pockets, with tinned malleable hangers. Gearing and shafts are mounted on a separate frame easily removed for repairs or repacking with grease. Complete with one set of 6 inch, 18 gram, 10 per cent. milk test bottles, one 17.6 cc pipette, one 17.5 cc acid measure, one test bottle brush and full directions.

No.	A	B	C	D
Capacity, bottles	6	8	10	12
Each	16.65	18.50	19.35	20.10

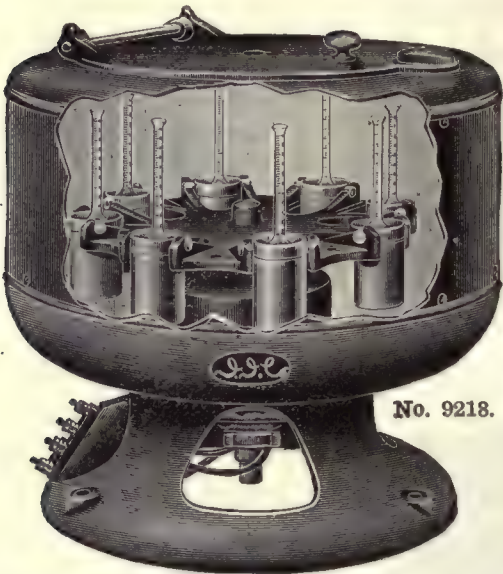
9206. **CREAM TESTER, Babcock, for hand power**, twelve bottle size, same as No. 9204 Milk Tester, but for 9 inch cream bottles. Complete with twelve 9 inch, 18 gram, 30 per cent. cream test bottles, one 18 cc pipette, one 17.5 cc acid measure, one test bottle brush, and full directions. 35.00

MILK TESTERS, Babcock, Electric, same style as Nos. 9194, but mounted directly on a vertical spindle electric motor. Prices include glassware and accessories listed under Nos. 9194 and 9196.

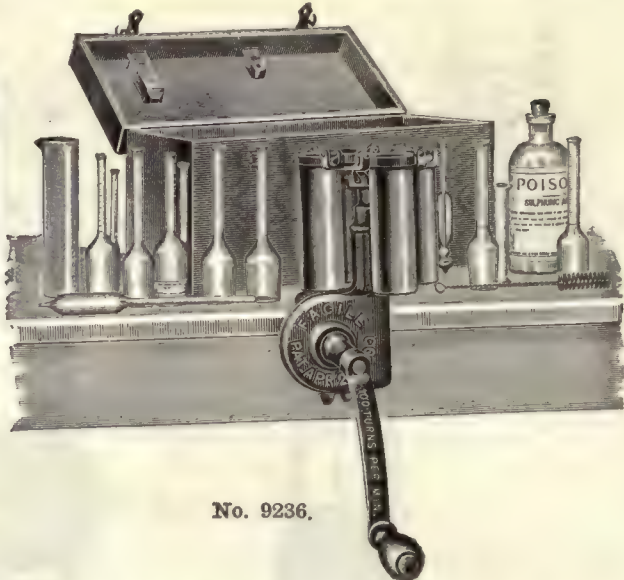
No.	A	B
Capacity, bottles.....	2	4
For 110 volts, A.C.....	50.40	51.60
For 110 volts, D.C.....	50.40	51.60

MILK TESTERS, Babcock, Electric, with same frame and bottle carrier as No. 9204. The motor which is a standard 1/2 h. p. G. E. motor with a speed of 1800 r. p. m., is carried on a separate frame or sub-base and is belt driven requiring no starting device. Prices include glassware and accessories listed under No. 9204.

No.	A	B	C
Capacity, bottles.....	6	8	10
For 110 volts, A.C.....	74.80	75.90	78.10
For 110 volts, D.C.....	74.80	75.90	78.10



No. 9218.



No. 9236.

9218. **MILK TESTERS, Babcock, International Electric No. 1, for 8 bottles.** This is the regular No. 2670 International Centrifuge, equipped with No. 2685 Head with trunnion rings and cups for 8 six-inch milk bottles. This head is interchangeable with any of those listed in Accessories for International Centrifuge No. 1. (See general heading **Centrifuges**.) Height closed, 18 inches; open, 28 inches; diameter, 17 inches; shipping weight, about 160 pounds. Complete with 8 trunnion buckets and speed control rheostat but without glassware.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	\$101.40	105.00	97.80	101.40

9220. **MILK TESTERS, Babcock, International Electric No. 2, for 16 bottles,** for use with either 6-inch milk bottles or 9-inch cream bottles. This is the regular International Centrifuge No. 2696 equipped with No. 2708 Head with trunnion rings and cups for 16 bottles. This head is interchangeable with any of those listed in Accessories for International Centrifuge No. 2. (See general heading **Centrifuges**.) Height closed, 28 inches; open, 40 inches; diameter, 24 inches; shipping weight, about 450 pounds. Complete with 16 trunnion buckets for 6-inch milk bottles, speed control rheostat, and mechanical brake but without glassware.

No.	A	B	C	D
	A.C.		D.C.	
For volts	110	220	110	220
Each	220.00	220.00	220.00	220.00

9222. **MILK TESTERS, Babcock, International Electric No. 2, for 24 bottles.** This is a modified form of the No. 2696 International Centrifuge, having a 12-place head which carries double trunnion rings and buckets for all styles of Babcock test bottles. Height closed, 28 inches; open, 40 inches; diameter, 24 inches; shipping weight, about 450 pounds. Complete with trunnion buckets, speed control rheostat, and mechanical brake, but without glassware.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	180.00	180.00	180.00	180.00

HEATERS, Electric, for use with International Electric Babcock Testers, for heating test bottles while in the centrifuge. Operates on the same current as the motor.

No.	A	B
For Centrifuge No.....	9218	9220-2
For 110 volts.....	13.20	14.30
For 220 volts.....	13.20	14.30

9228. **METAL CUP** for use with Nos. 9218 and 9220, for 9-inch Babcock bottles..... .83

9229. **TRUNNION RING** for No. 9228..... .55

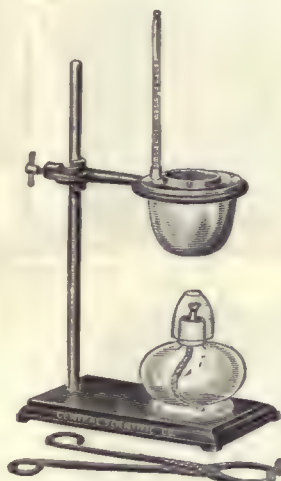
9236. **MILK TESTER, Babcock, Traveling Outfit,** consisting of two-bottle Babcock Tester No. 9194, and the following accessories:

2 6-inch, 18-gram, 10% milk test bottles.	1 floating dairy thermometer.
2 6-inch, 18-gram, 30% cream test bottles.	1 hydrometer jar, 10x1½ inches.
2 double neck skim milk bottles.	1 17.5 cc acid measure.
1 cream and milk pipette (17.6-18 cc.)	1 small Quevenne's lactometer.
1 test bottle brush.	1 set directions.

Complete in handsomely finished hardwood case with separate compartments for glassware and acid 13.75



No. 9240.



No. 9262.

9238. **MILK TESTER, Babcock, Traveling Outfit**, same as No. 9236, but with four-bottle Babcock Tester No. 9200, and two extra milk test bottles \$15.00
9240. **MILK TESTER, Babcock, Traveling Outfit**, consisting of No. 9200 Babcock Tester in a handsome leather case as shown in the illustration, $10\frac{1}{2} \times 10\frac{1}{2} \times 10\frac{1}{2}$ inches outside. Complete with the same equipment of glassware and accessories as listed under No. 9238..... 31.25

Repairs for Babcock Milk Testers

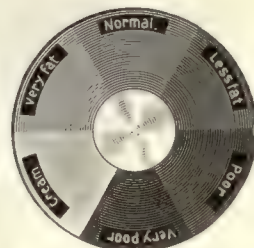
Nos. 9194 to 9200 and 9236 to 9240.

The numbers in parenthesis are the manufacturer's numbers, which in some instances appear on the parts.

9241. **COVER**, with thumb screw and collar. This is the part of the gear case which attaches to the table. (452-1)60
9242. **CASE**. This is the front of the gear case on which the name "Facile" appears. (451-1). .72
9243. **THUMB SCREW**. (454H)..... .18
9244. **SWIVEL** or collar for thumb screw. (454G)..... .06
9245. **SCREWS** for cover. (454I)..... .03
9246. **CRANK** only, without handle. (453)..... .24
9247. **CRANK**, complete with handle. (454E)..... .30
9248. **WOOD HANDLE** for crank. (454D)..... .06
9249. **HANDLE RIVET**. (454C)..... .06
9250. **CRANK SHAFT**. (454B)..... .12
9251. **TAPER PIN** for attaching crank to crank shaft. (454F)..... .03
9252. **GEAR** for inner end of crank shaft. (454)..... .90
9253. **WORM SPINDLE**, with slot at top for head. (454A)..... .42
9254. **BALL** for bearing. (454J)..... .03
9255. **TWO-BOTTLE HEAD**, with rivets and pins, but without cups or cup holders. (455)..... .10
9256. **FOUR-BOTTLE HEAD**, with rivets and pins, but without cups or cup holders. (456).... .90
9257. **CUP HOLDER AND BRASS CUP**. (457-457A)36
9262. **MOISTURE TESTER, Ames**, for moisture in butter, consisting of a jacketed paraffine container made of copper. The outside shell has a rounded bottom to expose as much surface as possible to the heat from an alcohol lamp. An aluminum sample cup fits closely within the inside shell, having contact all the way down so that the heat from the paraffine is transmitted without loss. Complete with nickel-plated support stand, special thermometer reading from 100 to 200°C., alcohol lamp, tongs for lifting the sample out, and full directions.. 6.00
9266. **PAPER, Fat Free**, for the determination of fat in milk, according to Adams' method. In boxes of 50 strips, 560x65 mm.....per box 2.80



No. 9270.



No. 9272.



No. 9288.



No. 9292.



No. 9280.



No. 9282.

9270. **PASTEURIZING OUTFIT**, for steam or hot water, consisting of a neatly finished vessel with convenient handles and cover, and with rack for holding eight sterilizing bottles. Beads around the sterilizing chamber mark the points to which water should be filled. Complete with bottles and brush for cleaning..... **\$4.50**

9272. **PIOSCOPE**, or Milk Tester, Heeren's. For showing the richness of milk by color comparison. A set of appropriately labeled standard colors is furnished, together with a convenient means of comparing with the standards the color assumed by the sample of milk during the test... **.75**

9276. **PIPETTES, Cream.**

No.	A	B
Capacity, cc.	9	18
Each .....	.15	.15
Per dozen	1.50	1.50

9278. **PIPETTES, Milk.**

No.	A	B
Capacity, cc.	8.8	17.6
Each .....	.15	.15
Per dozen	1.50	1.50

9280. **PIPETTES, Milk**, 17.6 cc, in accordance with the specifications formulated by the Bureau of Standards and adopted by the Official Dairy Instructors' Association and by the State of Indiana **Each .35**

Per dozen 3.50

9282. **PIPETTES, Milk**, 17.6 cc, in accordance with the specifications formulated by the Dairy and Food Commission of Wisconsin..... **Each .35**

Per dozen 3.50

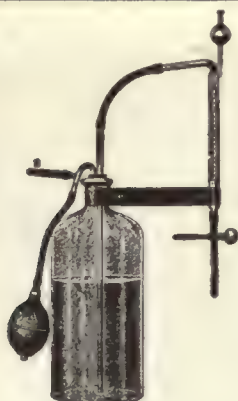
9284. **PIPETTES, Milk and Cream**, 17.6-18 cc combined **Each .19**

Per dozen 1.90

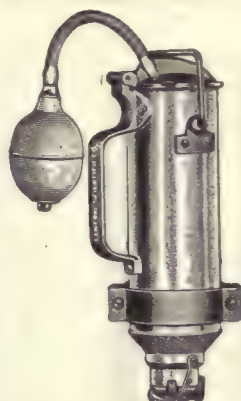
PIPETTES, Volumetric, see general heading **Pipettes**.

9288. **BACK**, for Babcock Test Bottles, of tin. Hangs flat against the wall; the bottles stand upright and are easily filled. Capacity, 24 bottles..... **1.80**

9292. **RENNET TESTER**, Marshall, a simple, reliable and indispensable aid to every cheese maker. It enables the maker to ascertain the condition of the milk, and to regulate its ripening to an exact point, alike every day, which is very essential in order to insure uniform work and uniform quality of the cheese. Includes graduated cup (a), a 1 cc pipette (b), a bottle (c) in which to dilute the rennet, and a spatula (d) for stirring the milk. Complete in a handsome case **4.00**



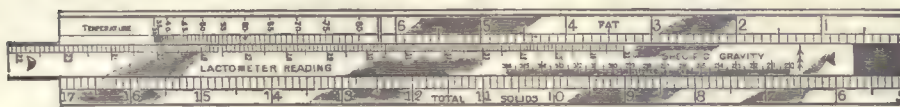
No. 9298.



No. 9308.

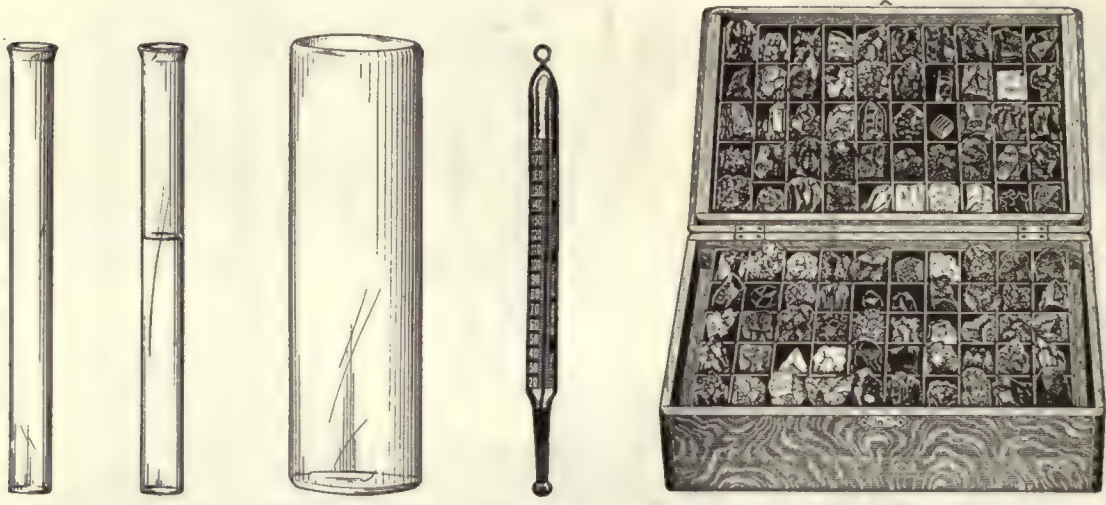


Nos. 9322-5.



No. 9314.

9298. **SALT TESTER FOR BUTTER, Nafis.** This apparatus is automatic, easy to manipulate, and self-adjusting, and is especially suited for rapid determination of the per cent. of salts in butter. The liquid in the graduated tube instantly readjusts itself to zero so that the only reading to be taken in using the apparatus is at the point on the graduated scale where the liquid surface is located after the test is completed. With a 10-gram sample of butter each cc of solution drawn from the burette will equal $\frac{1}{2}$ per cent. salt in the butter. Complete as illustrated together with 10-gram weight, 250 cc flask, standard solution in dry form, 25 cc pipette, porcelain cup, stirring rod, medicine dropper, beaker, 2-ounce bottle of indicator, and full directions..... **\$6.50**
9299. **STIRRING ROD, Nafis' Faultless**, for use in No. 9298 Salt Tester. This rod is colored to show the exact tint taken by the sample when the test is complete..... **.15**
9302. **SCORE CARDS, Dairy Cattle**, in tablets of 50 sheets **Per tablet .20**
9304. **SCORE CARDS, Market Cream**, in tablets of 50 sheets **Per tablet .20**
9308. **SEDIMENT TESTER for Milk**, as described by Professors Babcock and Farrington. Consists of a cylinder $2\frac{1}{2}$ inches in diameter and 6 inches long, funnel shaped at the bottom and terminating in an opening about 1 inch in diameter. In the cap at the bottom is a wire gauze strainer on which a thin disk of absorbent cotton is placed. After a pint sample of milk has been filtered through the apparatus, the cotton filter, with the dirt which it has collected, is detached and allowed to dry. The amount of dirt obtained will differ with different lots of milk and disks when dry may be returned to the milk producer as evidence as to the cleanliness of the milk. The central cylinder is surrounded by a steam or hot water jacket with $\frac{1}{2}$ inch intervening space so that the milk can be kept hot and the filtering process thereby hastened. Complete with 500 disks and with bracket for mounting against the wall. **12.00**
9309. **DISKS, Absorbent Cotton**, for use with No. 9308 Sediment Tester, in boxes of 100, **per box .50**
9314. **SLIDE SCALE, Richmond's**, for calculating the total solids in milk, with scale for temperature correction of specific gravity. This slide rule will be found of great advantage and service to cheese factory men and milk inspectors, as well as those interested in the preparation and examination of milk for use of children and invalids..... **5.50**
9316. **TABLETS, Corrosive Sublimate**, for keeping milk samples sweet. Used in making composite tests. Will color samples so that danger of mistakes is avoided. Small size will keep samples sweet for two weeks. In boxes of 50 tablets..... **Per box .30**
9317. **TABLETS, Corrosive Sublimate**, same as No. 9316, but large size, will keep samples sweet for four weeks. In boxes of 50 tablets..... **Per box .50**
9322. **TESTER, Nafis, for Babcock Test Bottles**, made of brass. To make a test, fill the bottle with alcohol deeply colored with black aniline or writing ink until it is almost opaque (this does away with the meniscus) so that the highest point is exactly even with the zero mark. Then slowly lower the Tester into the bottle until the liquid rises half way between the two sections. At that point should be the middle mark. After that point is tested for, slowly lower the entire tester into the bottle so that the liquid rises over the top of the upper section about an eighth of an inch. If the liquid is even with the top mark and was also at the middle mark, the bottle is correct. For 6 inch, 10% milk test bottles..... **1.00**
9323. **TESTERS, Nafis**, same as No. 9322, but for 6-inch 18-gram cream test bottles.
- | No. | A | B | C |
|------------------------|------|------|------|
| For bottles, per cent. | 30 | 40 | 50 |
| Each | 1.25 | 1.50 | 1.65 |
9324. **TESTER, Nafis**, same as No. 9322, but for 6-inch, 9-gram, 50% cream test bottles..... **1.65**



No. 9330. No. 9332. No. 9334. No. 9338. No. 9342.

9325. **TESTERS**, Nafis, same as No. 9322, but for 9-inch cream test bottles.
- | No. | A | B | C |
|------------------------|--------|------|------|
| For bottles, per cent. | 30 | 50 | 55 |
| Each | \$1.65 | 1.65 | 1.65 |
9330. **TEST TUBES**, Butter Fat Oil, plain, 9x $\frac{3}{4}$ inches Per dozen .90
9332. **TEST TUBES**, Butter Fat Oil, with line 5 inches from bottom..... Per dozen .90
9334. **TEST TUBES**, Cream, heavy, for samples, 5x1 $\frac{1}{4}$ inches Per dozen .90
9338. **THERMOMETER**, Dairy, standard, for those who wish a more accurate thermometer than the ordinary. Hand-written paper scale, one degree graduation, accurate within one division of the scale, weighted with shot and guaranteed to float upright. Ten inches long. Approximate scale range 10° to 110° Fahrenheit..... 2.40
9340. **THERMOMETER**, Pasteurizing, with enclosed hand-written paper scale; approximate scale range 30° to 220° Fahrenheit; graduated in 2° divisions and accurate within one division of the scale..... 2.20
- MILLS**, see *Crushing and Grinding Apparatus*.
9342. **MINERAL COLLECTION**, in wooden cases with covers, each specimen being in a pasteboard tray with a label giving the name and locality. 100 specimens 5x6 cm..... 35.00

LIST OF MINERALS INCLUDED.

- | | | | |
|---------------------------|-------------------------------|----------------------------|---------------------------|
| 1. Graphite. | 26. Quartz, Chalcedony. | 51. Aragonite. | 76. Natrolite. |
| 2. Sulphur. | 27. Quartz, Agate. | 52. Witherite. | 77. Muscovite. |
| 3. Copper. | 28. Quartz, Flint. | 53. Strontianite. | 78. Lepidolite. |
| 4. Orpiment. | 29. Quartz, Jasper. | 54. Cerussite. | 79. Prochlorite. |
| 5. Stibnite. | 30. Opal, Semi-opal. | 55. Malachite. | 80. Serpentine. |
| 6. Molybdenite. | 31. Cuprite. | 56. Orthoclase xld. | 81. Talc, foliated. |
| 7. Galena. | 32. Corundum. | 57. Orthoclase-cleavage. | 82. Talc soapstone. |
| 8. Chalcocite. | 33. Corundum-Emery. | 58. Orthoclase-Sanidine. | 83. Sepiolite, Meerschm. |
| 9. Sphalerite. | 34. Hematite crystal. | 59. Oligoclase. | 84. Kaolinite. |
| 10. Cinnabar. | 35. Hematite compact. | 60. Labradorite. | 85. Titanite. |
| 11. Millerite. | 36. Ilmenite. | 61. Enstatite. | 86. Apatite. |
| 12. Niccolite. | 37. Magnetite. | 62. Pyroxene. | 87. Apatite, Phosphorite. |
| 13. Pyrrhotite. | 38. Chromite. | 63. Wollastonite. | 88. Lazulite. |
| 14. Bornite. | 39. Braunitz. | 64. Amphibole, Actinolite. | 89. Wavellite. |
| 15. Chalcopyrite. | 40. Cassiterite. | 65. Amphibole, Hornblende. | 90. Barite. |
| 16. Pyrite. | 41. Rutile. | 66. Garnet. | 91. Anglosite on Galena. |
| 17. Cobaltite. | 42. Pyrolusite. | 67. Crysolite, Olivine. | 92. Gypsum. |
| 18. Arsenopyrite. | 43. Limonite. | 68. Vesuvianite. | 93. Gypsum, Alabaster. |
| 19. Halite. | 44. Bauxite. | 69. Zircon. | 94. Alunite. |
| 20. Fluorite. | 45. Calcite crystal. | 70. Andalusite. | 95. Wolframite. |
| 21. Cryolite. | 46. Calcite, Cleavage. | 71. Cyanite. | 96. Ozocerite. |
| 22. Quartz, Rock Crystal. | 47. Calcite-Marble. | 72. Epidote. | 97. Amber. |
| 23. Quartz, Amethyst. | 48. Magnesite. | 73. Calamine. | 98. Asphaltum. |
| 24. Quartz, Rose. | 49. Siderite. | 74. Tourmaline. | 99. Anthracite. |
| 25. Quartz, Smoky. | 50. Siderite-Clay Iron-Stone. | 75. Chabazite. | 100. Cannel Coal. |

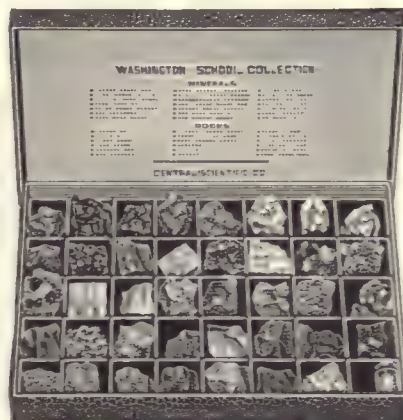
9343. **MINERAL COLLECTION**, same as No. 9342, but 100 specimens 3x4 cm..... 23.00
9344. **MINERAL COLLECTION**, same as No. 9343, but in pasteboard box instead of wooden case 18.00

MINERALS FOR WIRELESS TELEGRAPHY.

	Per ounce.		Per ounce.
Bornite, pure .....	.20	Molybdenite .....	.20
Carborundum, crystals.....	.15	Silicon, fused .....	.20
Chalcopyrites, with Iron Pyrites...	.10	Stibnite, crystallized .....	.20
Chalcopyrites, pure .....	.15	Zincite, 70 per cent. ....	.40
Franklinite .....	.10	Zincite, 100 per cent.....	.65
Galena, cubical.....	.10	Rose's Metal, M. P. 203° F.....	.30
Iron Pyrites, crystallized, radiated.	.10	Wood's Metal, M. P. 158° F.....	.30
Iron Pyrites, crystallized, cubical..	.15		



No. 9346.



No. 9347.

9346. **MINERAL COLLECTION.** An exceedingly fine collection of 110 specimens in a substantial hardwood box 23x15½x5 inches, with hinged cover. The specimens are in pasteboard trays, fitting in two wood trays, and are from one to three inches in linear dimensions, each one being labeled. Contains every important mineral, including ores of

Aluminum,	Gold,	Molybdenum,	Tin,
Antimony,	Iron,	Nickel,	Titanium,
Arsenic,	Lead,	Radium,	Tungsten,
Bismuth,	Lithium,	Silver,	Uranium,
Cobalt,	Manganese,	Strontium,	Vanadium,
Copper,	Mercury,	Tantalum,	Zinc,

and a large number of miscellaneous minerals \$40.00

9347. **MINERAL COLLECTION (Washington School Collection).** Contains the following minerals and rocks, good size, each labeled and placed in a separate tray. The whole in a neat cloth covered case with a set of unlabeled duplicates (Set No. 9348) for student 4.50

MINERALS

1. Graphite.	8. Quartz, Milky.	15. Amphibole (Hornblende).
2. Galena.	9. Hematite.	16. Amphibole (Asbestos).
3. Sphalerite.	10. Magnetite.	17. Garnet.
4. Chalcopyrites.	11. Limonite.	18. Muscovite.
5. Pyrites.	12. Calcite.	19. Talc.
6. Fluorite.	13. Siderite.	20. Gypsum.
7. Quartz Crystal.	14. Orthoclase.	

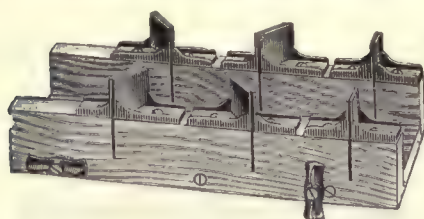
ROCKS.

1. Conglomerate.	8. Fossiliferous Limestone.	15. Gneiss.
2. Friable Sandstone.	9. Compact Limestone.	16. Mica Schist.
3. Red Sandstone.	10. Peat.	17. Quartzite.
4. Potter's Clay.	11. Lignite.	18. Clay Slate.
5. Shale.	12. Basalt.	19. Dolomite.
6. Calcareous Tufa.	13. Granite.	20. Residual Sand.
7. Oolitic Limestone.	14. Diabase.	

9348. **STUDENT'S COLLECTION**, consisting of smaller duplicate unlabeled specimens of Set No. 9347 for student classification45

9349. **TRAYS, Mineralogical Specimen**, made of heavy cardboard, covered on outside with black cloth. Inside black. Depth of each tray, ¾ inch.

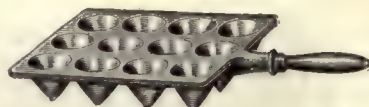
No.	A	B	C	D
Size, outside, in inches.....	2x3	3x4	4x6	6x8
Each10	.10	.15	.20
Per 100	6.00	7.00	10.00	15.00



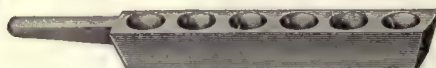
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No. 9368.



No. 9374.



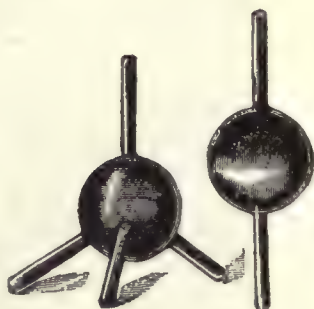
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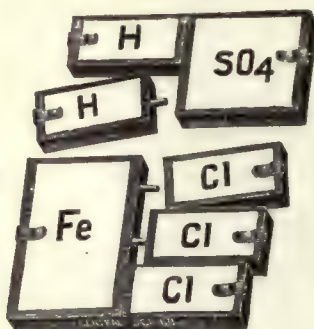
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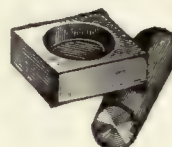
No. F7115.



No. 9360.



No. 9362.



No. 9384.



No. 9386.

9350. **MITRE BOX**, Olmstead's. Can be used with ordinary hand saw, which will do perfect work and not cut the frame away. Provided with iron guides for saw. Small size, will cut $1\frac{1}{2}$ -inch moulding, etc..... \$1.95

MITTENS, see **Gloves**.

9360. **MODELS**, Atomic, Kekule and Von Baeyer, consisting of 20 black balls with four connecting posts each, 10 red balls with two connecting posts each, 30 white, 10 yellow, 10 green, 10 violet, and 10 silver colored balls each with tubular attachments to slip on the connecting posts, and 15 nickel-plated binding posts with two clamps..... 45.00

9362. **MODELS**, Valence, Nead's. The blocks representing the positive elements are provided with pins which fit into corresponding holes in the blocks which represent the negative elements or radicals. On each block is a clip for holding a card on which is printed the symbol of the element represented. With these blocks valence, the idea of bonds between the atoms in combination, and equation writing are made perfectly clear. The set includes 12 blocks for univalent elements, 6 for bivalent, and 4 for trivalent, half of each being positive, and 100 printed cards for symbols of elements and radicals..... 5.00

MOIST CHAMBERS, see **Culture Dishes**.

MOISTURE TESTERS, see **Grain Testing Apparatus**.

MOLD, Briquette, see **Asphalt Testing Apparatus**; **Cement Testing Apparatus**.

MOLDS, Cement, see **Cement Testing Apparatus**.

MOLDS, Cupel, see **Cupel Molds**.

9368. **MOLD**, Pouring, of cast iron with wood handle, with 3 conical depressions $2 \times 1\frac{1}{2}$ inches each, tapering to a fine point, for crucible and scorification assays..... .75

9370. **MOLD**, Pouring, of heavy solid iron, with six conical machine drilled depressions, $2\frac{1}{4} \times 1\frac{1}{8}$ inches each, with iron handle, for crucible and scorification assays..... 2.50

9372. **MOLD**, Pouring, of cast iron, with wood handle and two smooth drilled cavities..... 1.50

9374. **MOLDS**, Pouring, cast iron, with wood handle and round holes, for crucible and scorification assays.

Number of cavities..... 6 12

Each75 2.25

MOLECULAR WEIGHT DETERMINATION APPARATUS, see **Physical Chemistry Apparatus**.

F7115. **MONOCHROMATIC FLAME ATTACHMENT** for Bunsen burners. A small reservoir which slips over the top of the burner is provided with an asbestos wick at the center. This wick surrounds the mouth of the burner closely and feeds up to the flame any solution placed in the reservoir. The flame is therefore continuously colored with the characteristic color of the salt which is in the solution, and frequent renewals are not necessary, as only a small portion of the dissolved substance is consumed. As the water evaporates more is easily supplied. For any burner with $\frac{1}{16}$ -inch tube..... 1.50

9384. **MORTAR**, Diamond, Leed's Form, of hardest steel. Pestle 50x15 mm..... 3.50

9386. **MORTARS**, Diamond, Plattner's, of hardest steel.

No. A B

Diameter of pestle, mm..... 15 25

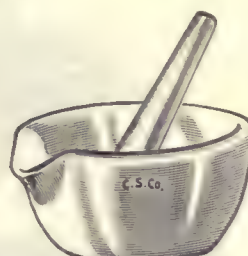
Each 4.50 6.00



No. 9390.



No. 9394.



No. 9396.



No. 9388.



No. 9402.

9388. MORTARS, Glass, with pestle.

No.	A	B	C	D	E
Capacity, ounces	2	4	8	16	32
Diameter outside, inches.....	2¾	4	4½	5	6
Each	\$0.26	.40	.50	.80	1.20

9390. MORTARS, Iron, vase shape, heavy, with pestle.

No.	A	B	C	gallons	D	E
Capacity, pints	1	2	4	1	2	
Size, inches	4½x5	5½x6	6½x6	8x7	10½x9	
Each	1.20	1.60	2.25	3.50	6.40	

9394. MORTARS, Iron, Buck's, for grinding and amalgamating. By rotation of the muller, a large sample of quartz may be ground in contact with mercury.

No.	A	B
Diameter outside, inches.....	6½	8½
Total weight, pounds.....	30	76
Weight of muller, pounds.....	16	49
Each	10.00	12.50

9396. MORTARS, Porcelain, with spout and pestle; glazed outside, rough inside.

Outside diameter, mm.....	65	80	100	110	130	150	165	185	213
Each .....	.35	.50	.60	.70	.95	1.25	1.35	1.55	2.20

9402. MORTARS, Wedgewood, acid proof, pestle with wood handle.

No.	0000	000	00	0	1	2	3	4	5	6
Diameter outside, inches....	3	3½	4	4½	5	5½	6¾	7¼	8	9
Each .....	.68	.76	.86	.92	1.00	1.20	1.40	1.60	1.90	2.30

MORTAR, Automatic Grinding, see Crushing and Grinding Apparatus.**MOTORS, Electric, see Electrical Instruments.****MOTOR-GENERATORS, see Electrical Instruments.****MOUSE JARS, see Animal Holders.****MUFFLE FURNACES, see Furnaces.****MUFFLES for Gas and Oil Heated Furnaces, see Furnaces, Muffle.****MUFFLES, Alundum, see note under Muffles, Opaque Fused Silica.****MUFFLES, Clay, all kinds and sizes, send for special bulletin giving sizes and prices.****MUFFLES, Opaque Fused Silica, see note below.**

Note:—Owing to the great variety of sizes and shapes of muffles in use throughout the country, we have made no attempt to offer a complete list in this catalog. We shall be very glad to quote prices upon request upon muffles made of alundum, clay or silica. As it is very important that the muffle shall fit the space for which it is ordered, we urge that orders or requests for prices be accompanied by (1) a list of dimensions both outside and inside, (2) a statement as to whether both ends are open or one closed, and (3) a sketch showing the exact shape of the cross section of the old muffle.

MUSEUM JARS, see Jars.



MOTORS, WATER

9408. **MOTOR, WATER**, 5 inches in diameter; may also be used with steam or compressed air. Has a two-speed steel pulley for $\frac{7}{32}$ -in. round belt. Attains the following speeds, depending on the water pressure.

Water pressure, lbs.....	20	30	40	50	60
No. of r. p. m.....	2300	2800	3400	3850	4200

This motor may be attached to an ordinary apparatus stand and used for either stirring or shaking. The inlet pipe is threaded $\frac{1}{4}$ in. I. P. thread \$7.50

9410. **MOTOR, CENCO WATER**, a reliable motor made by one of the largest manufacturers of water motors and fully guaranteed. This motor will be found useful for power in grinding, buffing, etc., and as a test of efficiency in the laboratory, also in connection with bottle washing brushes, for the rapid cleaning of bottles, flasks, etc. Diameter 4 inches, weight 5 pounds. With 80 pounds water pressure will develop $\frac{1}{8}$ h. p. when connected with $\frac{1}{2}$ -inch house pipe. Complete with 4-inch beveled face emery wheel, one felt buffing wheel for brass and silver, one cake of brass and silver polish, one grooved wood pulley for $\frac{7}{32}$ -inch round belt (see No. F2857), and coupling for threaded faucet..... 5.00

9412. **MOTOR, CENCO WATER**. Same design as No. 9410. Diameter, 6 inches; weight, 7 pounds. With 80 pounds water pressure will develop $\frac{1}{4}$ h. p. when connected with $\frac{1}{2}$ -inch house pipe. Complete with grooved wheel for $\frac{7}{32}$ -inch round belt (see No. F2857), and coupling for threaded faucet, but without other accessories..... 8.00

9416. **MOTOR, CENCO WATER, Demonstration Form**. Same as No. 9410 Water Motor, but with one side of glass so that the action of the water wheel may readily be inspected..... 6.00

ACCESSORIES FOR CENCO WATER MOTORS.

9417. UNIVERSAL COUPLING for plain faucet (state outside diameter).....	.40
9418. EXTRA RUBBER for No. 9417 (state outside diameter of faucet).....	.15
9419. STEEL POLISH .....	.15
9420. QUART BOTTLE WASHER.....	.75
9421. PINT BOTTLE WASHER.....	.75
9422. EMERY WHEEL , beveled edge, 4-inch diameter, $\frac{5}{16}$ -inch hole. Regularly furnished with No. 9410	1.00

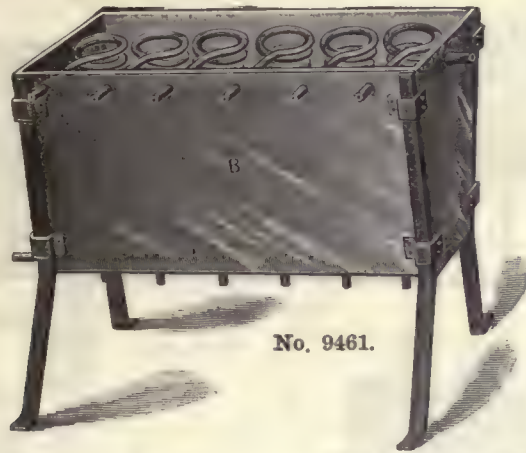
NOTE: The above three accessories are for use on Nos. 9410 and 9416 Cenco Water Motors. They may be used on No. 9412 Cenco Water Motor if No. 9423 Stud Shaft, listed below, is purchased.

9423. **STUD SHAFT**, for attaching to the shaft of No. 9412 Cenco Water Motor, to permit the use of Nos. 9420 to 9422 Accessories..... 1.00

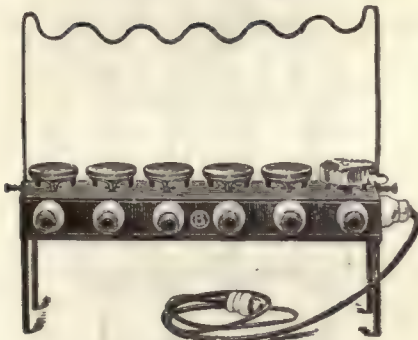
9450. **NAIL SETS**, made of high grade steel, 4 inches long, both ends hardened, centers nicely knurled, tips concaved, tops oval and the size exact.

No.	A	B
Diameter at tip, inches.....	$\frac{1}{16}$	$\frac{1}{8}$
Each .....	.15	.15

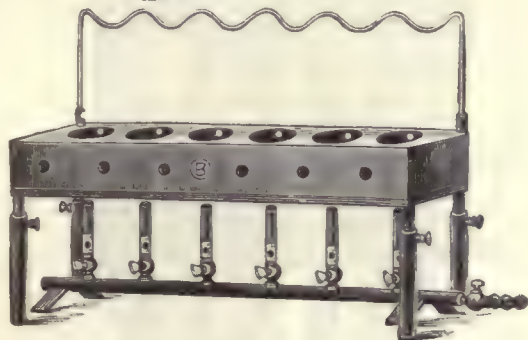
NIPPERS. see Pliers.



No. 9461.



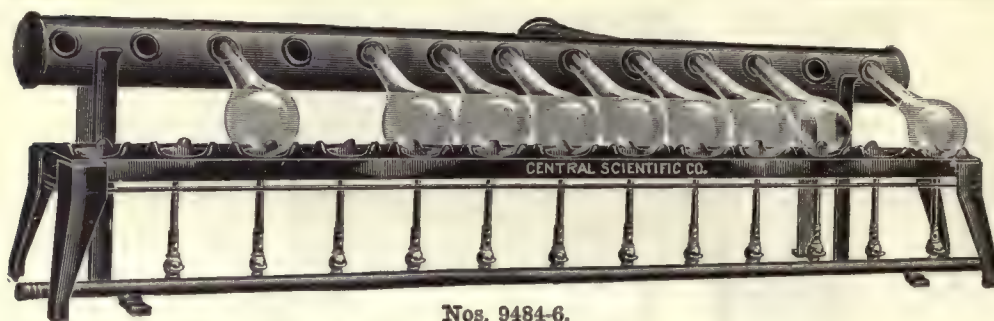
Nos. 7508-9.



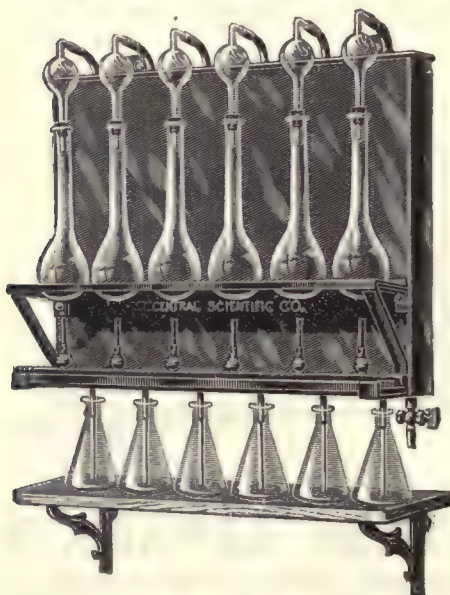
Nos. 9462-4.

NITROGEN DETERMINATION APPARATUS

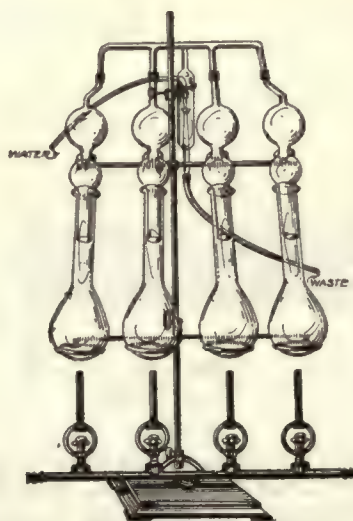
9460. **KJELDAHL APPARATUS** for Nitrogen Determinations, consisting of Condenser No. 9461 of polished copper with block tin tubes and Digestion Shelf No. 9462 of sheet iron, with burners provided with individual stop-cocks. Without glass flasks.
- | | | |
|-------------------------|---------|-------|
| No. | A | B |
| Numbers of burners..... | 6 | 10 |
| Each | \$53.50 | 75.00 |
9461. **KJELDAHL CONDENSERS** only of No. 9460, made of polished copper tin lined, with coils of pure block tin tubing. Width at top, 6½ inches; depth, 14 inches; height including legs, 24 inches.
- | | | |
|----------------------|-------|-------|
| No. | A | B |
| Number of coils..... | 6 | 10 |
| Length, inches..... | 24 | 40 |
| Each | 36.00 | 50.00 |
9462. **KJELDAHL DIGESTION SHELVES** only of No. 9460, made of sheet iron with iron rod to support flasks, mounted on adjustable legs. A special feature of this shelf is the separate stop-cock key provided to prevent burning the fingers when adjusting the flame. Height of apparatus to top of sheet iron shelf, 9½ inches; width, 5½ inches.
- | | | |
|------------------------------|-------|-------|
| No. | A | B |
| Number of burners..... | 6 | 10 |
| Length of shelf, inches..... | 24 | 40 |
| Each | 17.50 | 25.00 |
9464. **KJELDAHL DIGESTION SHELVES**, same as No. 9462, but furnished with burners for gasoline gas.
- | | | |
|------------------------|-------|-------|
| No. | A | B |
| Number of burners..... | 6 | 10 |
| Each | 22.00 | 32.50 |
6268. **EXTRA STOP-COCK KEY** for Nos. 9462 and 9464
- | | | |
|--|----|----|
| | A | B |
| | 6 | 10 |
| | 24 | 40 |
- KJELDAHL DIGESTION SHELVES**, electrically heated, with individual hot plates 3½ inches in diameter, each of which has a separate snap switch permitting any one or all to be used at a time. Made of sheet iron with support for flasks. Height to top of shelf, 9 inches; width, 5½ inches.
- | | | |
|---------------------------|----|----|
| No. | A | B |
| Number of hot plates..... | 6 | 10 |
| Length, inches..... | 24 | 40 |
7508. **For 110 volts**.....
- | | | |
|--|-------|-------|
| | 57.75 | 90.75 |
|--|-------|-------|
7509. **For 220 volts**.....
- | | | |
|--|-------|-------|
| | 57.75 | 90.75 |
|--|-------|-------|



Nos. 9484-6.



Nos. 9476-8.

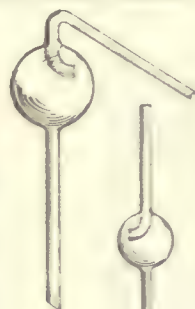


No. 9490.

9476. **KJELDAHL DISTILLING APPARATUS**, wall form. All working parts of the apparatus are readily accessible from the front. The burners are provided with stop-cocks for individual regulation so that any or all of the burners may be used at once. The condenser tank is of heavy copper with block tin condenser tubes. With 6 burners but without glassware \$55.00
9478. **KJELDAHL DISTILLING APPARATUS**, same as No. 9476, but with burners for gasoline gas 60.00
9480. **KJELDAHL DISTILLING APPARATUS**, same as No. 9476, but with supports to stand on the table. With 6 burners..... 60.00
9484. **KJELDAHL DIGESTION SHELVES**, Johnson's, consisting of a shelf of iron about 6 inches wide and 8½ inches high, with holes 4½ inches from center to center. The necks of the flasks rest in holes in a large lead tube to be connected with a chimney so that all fumes are carried away. Complete with Bunsen burners, with stop-cocks with separate key, but without flasks, lead pipe, or support for pipe.
- | | | | |
|---------------------------------|-------|-------|-------|
| No. | A | B | C |
| Number of burners..... | 6 | 10 | 13 |
| Approximate length, inches..... | 30 | 50 | 65 |
| Each | 22.50 | 27.50 | 32.50 |
6268. **EXTRA STOP-COCK KEY** for No. 9484..... 1.00
9485. **LEAD TUBING** for use with No. 9484, inside diameter, 4 inches.....per foot 1.00
9486. **LEAD TUBES** for No. 9484, inside diameter 4 inches, complete with holes for necks of flasks, and with support. With outlet tube 12 inches long, located in middle of long tube, unless specified otherwise in ordering.
- | | | | |
|----------------------|-------|-------|-------|
| No. | A | B | C |
| Number of holes..... | 6 | 10 | 13 |
| Each | 15.00 | 18.00 | 20.00 |
9490. **KJELDAHL DIGESTION APPARATUS**, Sy's Fumeless, permitting digestions to be made without the use of a hood, provided a water supply and drain are available. The glass filter pump effectually disposes of the fumes as they are generated. Complete with support stand, clamps, quadruple burner, filter pump, four bulb tubes and four 500 cc Kjeldahl flasks of Pyrex glass. (See Journal of Industrial and Engineering Chemistry, Vol. IV No. 9, for September 1912)..... 18.00

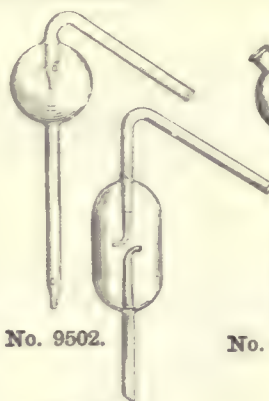


No. 9494.



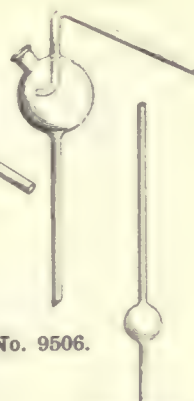
No. 9498.

No. 9500.



No. 9502.

No. 9504.

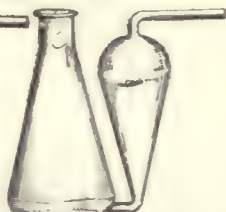


No. 9506.

No. 9512.



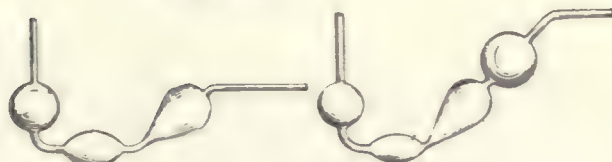
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No. 9520.



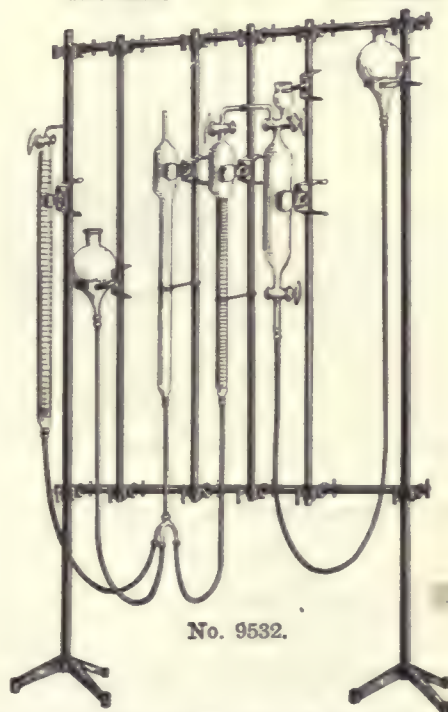
No. 9522.



No. 9524.



No. 9526.

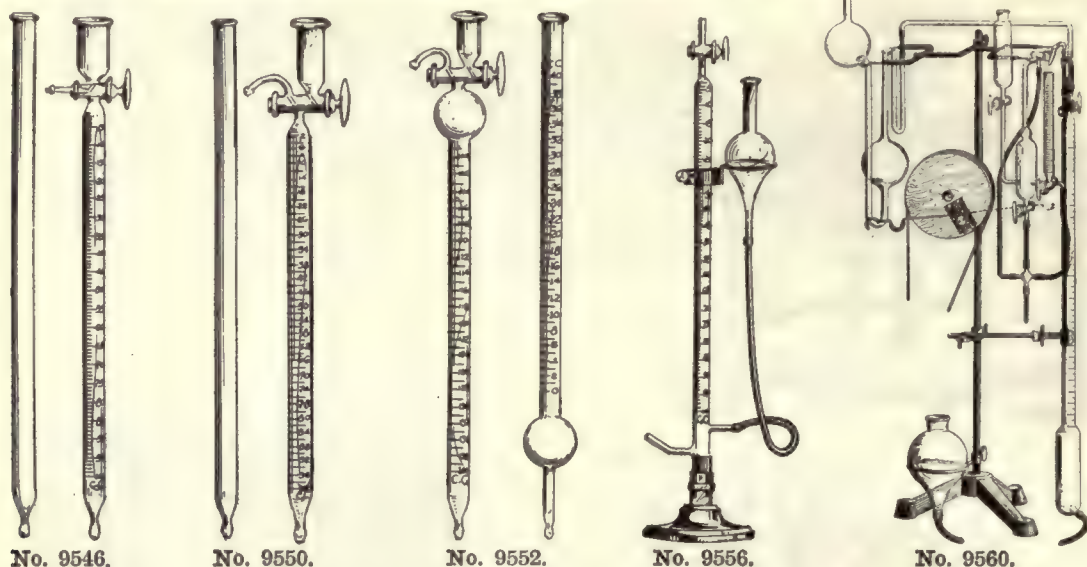


No. 9532.

9494. **KJELDAHL DIGESTION SHELF**, round form, with openings for six flasks and support adjustable in height for the necks. Diameter, 16 inches; height, 10 inches. Complete with 6 burners, each with stop-cock. \$20.00
9498. **KJELDAHL CONNECTING BULB**, original design50
9500. **KJELDAHL CONNECTING BULB**, same as No. 9498, but with straight connecting tube for bending to any angle.50
9502. **KJELDAHL CONNECTING BULB**, as modified by Hopkins. (See Journal of American Chemical Society No. 3, 1896)60
9504. **KJELDAHL CONNECTING BULB**, cylindrical form80
9506. **KJELDAHL CONNECTING BULB**, Jennings', designed especially for water analysis to permit introduction of reagents without removing stopper80
9512. **DELIVERY BULB TUBE**, for Kjeldahl Apparatus. Prevents sucking back of condensed liquid from receiving flask.35
- For **KJELDAHL FLASKS**, see Flasks.
9518. **NITROGEN BULB**, Presenius'80
9520. **NITROGEN BULB**, Volhard's75
9522. **NITROGEN BULB**, Volhard's, latest form.75
9524. **NITROGEN BULB**, Will-Varrentrap's, with three bulbs.40
9526. **NITROGEN BULB**, Will-Varrentrap's, with four bulbs.50

NITROMETERS

9532. **NITROMETER**, Du Pont, latest modification. Used by manufacturers of explosives for the analysis of nitric acid, etc. Glass parts only as illustrated, with rubber tubing connections. (See Technical Paper 160 of the United States Bureau of Mines) 35.00



No. 9546.

No. 9550.

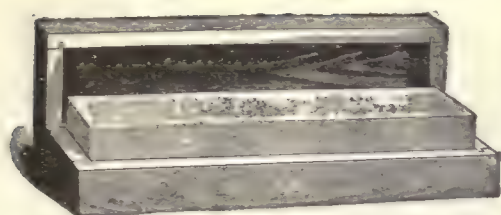
No. 9552.

No. 9556.

No. 9560.

Parts and Accessories for No. 9532

9533.	COMPENSATING TUBE only, with open tube for sealing when standardized.....	\$3.00
9534.	GENERATING BULB only, holding about 300 cc, with two stop-cocks and reservoir.....	10.00
9535.	MEASURING TUBE only, graduated from 10 to 14 per cent. in 0.01 divisions.....	8.00
9536.	MERCURY LEVELING BULBS only.....	each 1.25
9537.	THREE-WAY TUBE only, for connecting compensating tube to measuring tubes and leveling bulb .....	.75
9538.	UNIVERSAL TUBE only, graduated from 0 to 100 per cent. in $\frac{1}{10}$ divisions.....	12.00
9539.	IRON SUPPORT STAND for No. 9532, with six upright rods, rings for the leveling bulbs, clamps for the tubes, and clamps for the upright and cross rods. Made to order only.....	22.00
9546.	NITROMETERS, Lunge's, with three-way stop-cock and plain leveling tube. Graduated to, cc.....	50 in $\frac{1}{10}$ 100 in $\frac{1}{2}$
	Each	5.00 5.30
9550.	NITROMETERS, Lunge's, same as No. 9546, but provided with special three-way stop-cock. With plain leveling tube. Graduated to, cc.....	50 in $\frac{1}{10}$ 100 in $\frac{1}{2}$
	Each	5.25 6.00
9552.	NITROMETER, Lunge's, for larger volumes. Extensively used in the determination of nitrogen in gunpowder and explosives. Graduated from 100 cc to 140 cc in $\frac{1}{10}$ cc divisions, with graduated leveling tube.....	8.00
9556.	NITROMETER, Schiff's, graduated to 100 cc in $\frac{1}{6}$ cc divisions; on support with reservoir, clamp and connections.....	7.00
9560.	NITROGEN APPARATUS, Van Slyke's, for the Gasometric Determination of the Aliphatic Amino Groups. With this apparatus, a complete determination of the nitrogen in amino acids can be made in less than 10 minutes with an accuracy equivalent to that of the Kjeldahl method. It has the further advantage of permitting successive determinations to be made without disconnecting the parts. Any amount up to 10 cc may be analyzed with an accuracy of $\frac{1}{20}$ milligram of nitrogen. This apparatus can be used for the study of protein digestion, both in vitro and in vivo; the determination of the nature of the amino acids yielded by hydrolysis of small amounts of protein; determination of free amino groups in fixing the constitution of various organic substances, and the determination of amino acid nitrogen in urine, blood and tissues. Complete with glass parts and supports, pulley, shaking device and connections, but without electric motor. (See Journal of Biological Chemistry, Vol. XII, page 275, for 1911 and Vol. XVI, page 121 for 1913).....	42.00
9561.	GLASS PARTS only of No. 9560.....	22.00
9562.	DEAMINIZING VESSEL only of No. 9560.....	14.00
9562.	GAS BURETTE only of No. 9560, with three-way stop-cock, leveling bulb and connecting tubing	6.00
9564.	GAS PIPETTE only of No. 9560, for shaking.....	2.00
9566.	NITROGEN APPARATUS, Van Slyke's, similar to No. 9560, but smaller in size, so-called Micro size. Complete with supports, pulley, shaking wheel, and connections, but without motor	44.00
9567.	GLASS PARTS only of No. 9566.....	24.00
9568.	DEAMINIZING VESSEL only of No. 9566.....	16.00
9569.	GAS BURETTE only of No. 9566.....	6.00
9570.	GAS PIPETTE only of No. 9566.....	2.00



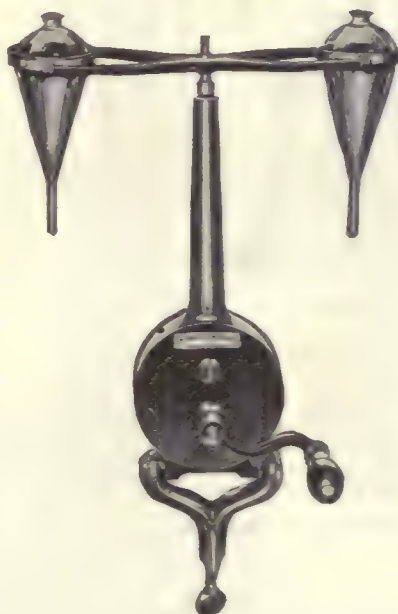
No. 9609.



No. 9612.



No. 9622.



No. 9620.

MOTORS, Variable Speed, for use with Nos. 9560 and 9566.

2361.	For 110 volts.....	\$23.00
2362.	For 220 volts.....	23.00

9580. **NOMON, a Calculating Chart, Chemists' Edition**, designed by Horace G. Deming of the University of Illinois. This device consists of a set of 18 sections bound together in book form, each section containing 13 engine divided scales, with about 40,000 separate points or subdivisions. By means of the Nomon, the mathematical operations of multiplication, division, raising to powers, extracting roots and determination of reciprocals can be performed rapidly and with an accuracy five times as great as with an ordinary slide rule. In addition practically all the special mathematical operations peculiar to chemistry and chemical engineering can be performed easily and accurately. Complete with book of scales, two sheets of reciprocal cross section paper, five place table of logarithms, and a manual of instructions containing tables of chemical data and factors conveniently arranged for use..... 1.00

9600. **OIL CAN**, zinc, diameter 2 inches, 22 cc capacity10

9601. **OIL CAN**, same as No. 9600, filled with fine sperm oil25

OIL SAMPLE BOTTLES, see general heading **Bottles**.

9608. **OIL STONE**, Washita, genuine, 5-inch, unmounted60

9609. **OIL STONE**, Washita, Mounted, same as No. 9608, mounted in case..... .70

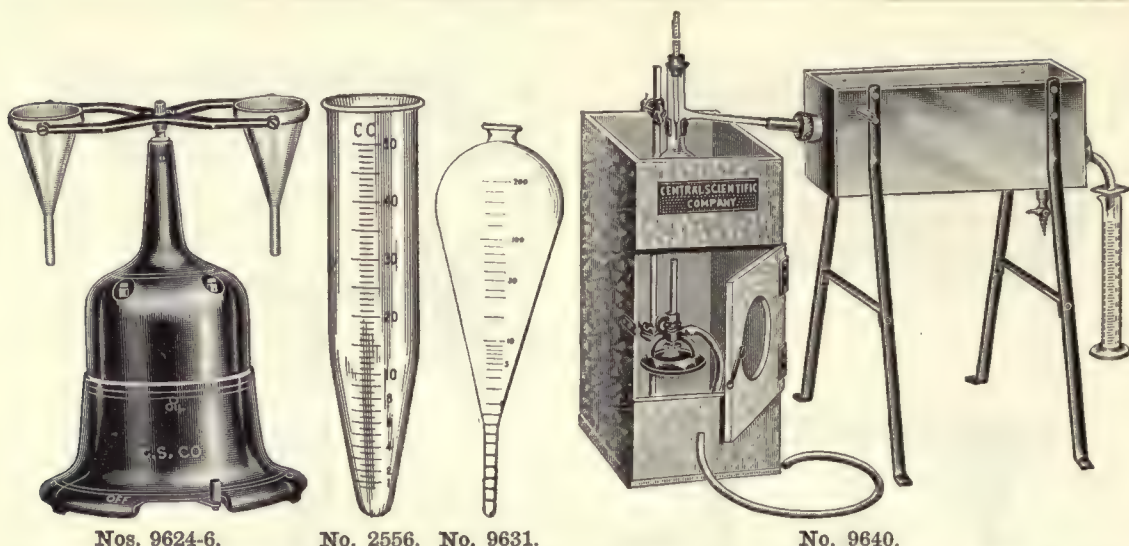
9612. **OIL STONE**, Washita Slip, beveled with rounding edge, for gouges and fine tools. Length, 4 inches30

OIL TESTING APPARATUS

CALORIMETERS, see general heading **Calorimeters**.

9620. **CENTRIFUGE, Hand Driven**, high speed, giving 1000 to 3000 revolutions per minute. The case is of iron well finished, the bearings of phosphor bronze accurately machined, the gear wheels of hard bronze cut by special machinery and the pitch so calculated as to render the machine almost noiseless in operation. Complete with disengaging handle, two-tube arm with conical shields, and with two Graduated Glass Tubes, No. 9631, reading directly in percentage of B. S. 30.00

9622. **CENTRIFUGE, Water Motor**, similar in construction to No. 9620, but operated by a ball-bearing water motor. The shaft is suspended on hardened steel ball-bearings in such a way that the water cannot come in contact with the bearing surfaces. In this way all danger of rust or clogging is avoided. Complete with 3 feet of pressure tubing, hose connection for ordinary smooth faucet, two-tube B. S. arm, and two Graduated Glass Tubes No. 9631, reading directly in percentage of B. S. 24.00



Nos. 9624-6.

No. 2556. No. 9631.

No. 9640.

9624. **CENTRIFUGE, Electric**, for 110 volts, mounted on heavy enameled cast iron base, enclosing the motor. The shaft is accurately centered, preventing vibration. The motor is carefully constructed for centrifuge work and is so wound that by shifting a single contact in the base, it can be changed from A.C. to D.C. or vice versa. It is not a universal motor. A rheostat in the base provides for three different speeds. Complete with two-tube B. S. arm with conical shields, two Graduated Glass Tubes No. 9631 reading directly in percentage of B. S., attachment cord and plug..... \$59.75
9626. **CENTRIFUGE, Electric**, same as No. 9624, but wound for 220 volts A.C. or D.C. The change from A.C. to D.C. or vice versa is made as in No. 9624, by shifting a single contact in the base 62.75

Parts and Accessories for Centrifuges.

9627. **ARM, Revolving, B. S.**, for Centrifuges Nos. 9620 and 9622, with trunnion rings and with two conical metal shields for use with 100 cc Glass Tubes No. 9631..... 17.30
9628. **ARM, Revolving, B. S.**, same as No. 9627, but made only for Centrifuges Nos. 9624 and 9626 18.75
9629. **ARM, Revolving**, for Nos. 9620-9622, with two trunnion rings and metal tube shields for use with 50 cc glass tubes No. 2556, for the examination of kerosene..... 17.30
9630. **ARM, Revolving**, same as No. 9629, but made only for Centrifuges Nos. 9624 and 9626.. 18.75
2556. **GLASS TUBES, Graduated**, for use with Nos. 9629-30, for the examination of kerosene. Capacity, 50 cc, graduated to read to $\frac{1}{2}$ cc in the tip.....each 1.00
9631. **GLASS TUBES, Graduated**, for use with Nos. 9627-8, for the determination of B. S. in oils. Capacity, 100 cc, graduated in 200 parts. As equal parts of oil and gasoline are mixed in making this test, this graduation enables the B. S. to be directly in percentage. By means of the narrow tip, amounts as small as $\frac{1}{10}$ of 1 per cent. can be measured.....each 1.50
9632. **METAL SHIELDS**, for use with Arms Nos. 9627 and 9628, for holding B. S. Tubes No. 9631 each 1.50
2558. **METAL SHIELDS**, for use with Arms Nos. 9629 and 9630, for holding Kerosene Tubes No. 2556 each .85

For other **CENTRIFUGES**, see general heading **Centrifuges**.

9640. **DISTILLATION APPARATUS**, for determining boiling and end points of gasoline, petroleum oils and paint thinners, according to the design of Sub-Committee XI of Committee D-1 of the American Society for Testing Materials. This apparatus is recommended as standard for the testing of motor gasoline by the United States Bureau of Mines. The apparatus consists of a copper condenser trough with brass condenser tube and support; a burner guard of galvanized iron lined with asbestos, with door and hand opening; a Bunsen burner adjustable for air and gas; 3 feet of rubber tubing to connect burner with gas supply; a support stand with 4-inch ring; asbestos mat 5x5 inches with $1\frac{1}{4}$ -inch circular opening; two clamps for supporting flask and burner; Engler flask, 100 cc; two corks for same, with hole for thermometer; thermometer graduated to 270°C., according to specifications of the Bureau of Mines; cork to connect Engler flask with condenser tube; graduated cylinder, 100 cc capacity; and piece of fiber board to fit over end of condenser tube and cover cylinder. Complete as illustrated, with directions for use. (See Standards of the American Society for Testing Materials adopted in 1917, page 8; Technical Paper 166 of the United States Bureau of Mines) 25.00



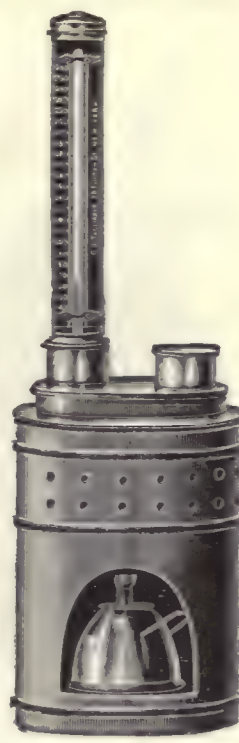
No. 9650.



No. 9652.



No. 9654.



No. 9658.

Parts and Accessories for No. 9640.

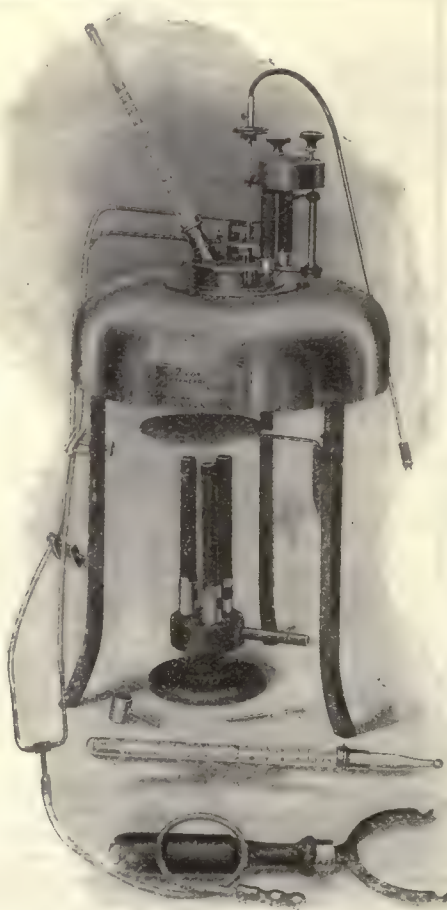
2194. **BURNER, Alcohol Lamp**, for use with No. 9640 when gas is not available. Burns with intensely hot blue sootless flame, using denatured alcohol. Burns 3 hours at one filling..... \$3.50
9641. **CONDENSER** only of No. 9640, made of polished copper with stop-cock for draining, with inner tube of brass 22 inches long and $\frac{1}{2}$ inch inside diameter, mounted on iron supports. Length of condenser, 15 inches; height over all, 17 inches..... 12.00
9642. **CORKS**, specially selected for use in distilling flasks, sizes No. 6, 7, and 8 assorted, in bags of 100.....per bag 1.25
9643. **FIBER BOARD**, with hole to fit over end of condenser tube and prevent escape of gas from receiving cylinder..... .10
- FLASKS, Distilling, Engler**, see general heading **Flasks**.
- GRADUATES, Cylindrical**, see general heading **Cylinders**.
9644. **GUARD**, for burner, of galvanized iron lined with asbestos..... 7.50
13622. **THERMOMETER** for Distillation of Gasoline, graduated to read from 0° to 270°C. Made according to specifications of the United States Bureau of Mines. Thermometers of other ranges or with Fahrenheit scale can be furnished shortly after receipt of order, if desired. (See Technical Paper 166, May 1917, page 21)..... 4.15
13624. **THERMOMETER, Solid Stem, Engraved Scale**, same as No. 13622, but graduated from 20° to 520°F., in 2° divisions..... 4.15
9645. **ASBESTOS MAT**, 5 inches square, with circular opening $1\frac{1}{4}$ inches in diameter, for shielding sides of flask from direct flame..... .10

FLASH POINT TESTERS

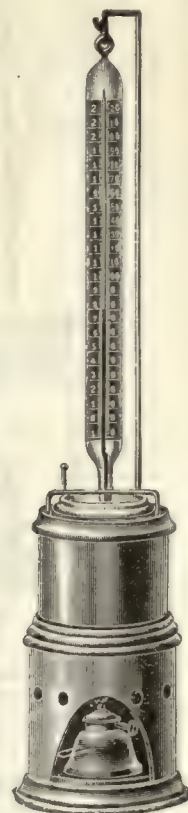
9650. **FLASH POINT TESTER, Cleveland Open Cup**, for high grade lubricating oils, made of heavy brass castings. Complete with standard solid stem thermometer, graduated from 20 to 720°F., with spirit lamp and Bunsen burner for gas 13.20
9652. **FLASH POINT TESTER, Cleveland Open Cup**, similar to No. 9650, but smaller and of lighter construction. Complete with solid stem thermometer and Bunsen burner..... 8.80
- 13636F. **THERMOMETER** only for Nos. 9650 and 9652, graduated from 20° to 720°F., in 2° divisions 4.95
9654. **FLASH POINT TESTER, Elliott's**, for illuminating oils only. Adopted as standard by the states of New York, New Jersey, Iowa and Michigan. Complete with glass cover, standard solid stem thermometer graduated to 300°F., lamp, thermometer holder, and directions for use 13.20
9655. **PERFORATED GLASS COVERS** for No. 9654each .50
- 13636B. **THERMOMETER** for No. 9654, graduated from 20° to 300°F., in 1° divisions..... 2.65
9658. **FLASH POINT TESTER, Foster's**, for illuminating oils only. Complete with standard solid stem thermometer graduated to 190°F., alcohol lamp, and directions for use..... 14.30
9659. **THERMOMETER** for No. 9658, graduated from 60° to 190°F., in 1° divisions, with metal scale 2.00



No. 9662.



No. 9668.

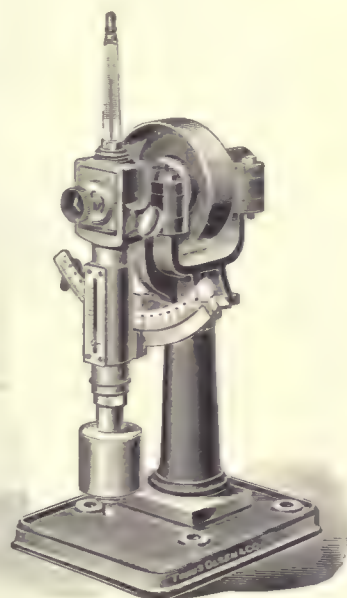


No. 9676.

9662. **FLASH POINT TESTER**, Abel-Pensky, United States Bureau of Mines Modification, for oils flashing from 0° to 110°C., with clock work to open cup and apply flame. Complete with three thermometers, stirring device, cup lifter, burner and aneroid barometer, in portable case with instructions for operation. (See Technical Paper No. 49 of the United States Bureau of Mines) \$148.50
9663. **THERMOMETERS** for No. 9662, for use in oil cup. With round bulb, graduated in 1/2° divisions.
- | | | |
|------------------------|------|--------|
| No. | A | B |
| Range, degrees C. | 0-50 | 40-110 |
| Each | 8.25 | 8.25 |
9664. **THERMOMETER** for No. 9662, for use in water bath, with cylindrical bulb, graduated from 0° to 85°C. in 1° divisions. 8.25
9668. **FLASH POINT TESTER**, Pensky-Martin, United States Bureau of Mines Modification, for oils flashing from 100° to 310°C. Consists of an oil cup with cover, fitted with stirrer, clockwork mechanism as in No. 9662 for opening cup and applying flame, and an air bath. Complete with two thermometers, cup lifter and burner, in portable case with instructions for operation. (See Technical Paper No. 49 of the United States Bureau of Mines) 132.00
9669. **THERMOMETERS** for No. 9668, for use in oil cup, with round bulb, graduated in 1° divisions.
- | | | | |
|------------------------|---------|---------|---------|
| No. | A | B | C |
| Range, degrees C. | 100-210 | 200-310 | 300-410 |
| Each | 8.25 | 8.25 | 9.90 |
9670. **OIL CUP** only for Nos. 9662 and 9668. 8.25
9676. **FLASH POINT TESTER**, Open Form, for illuminating oils. Complete with alcohol lamp, and standard paper scale thermometer. 6.60
9677. **GAS FLAME TESTING BURNER** for use with No. 9676 for dip or bar test. With stop-cock to control size of flame and hose for attachment to gas supply. 2.00
9678. **GLASS CUPS** only for No. 9676. each .35
per dozen 3.30
13608. **THERMOMETER** for No. 9676, graduated from -20 to 230°F. in 1° divisions. 3.30



No. 9686.



No. 9706.



No. 9694.

FLASKS, Distilling, Engler, see general heading Flasks.

FLASKS, Distilling, Hempel, see general heading Flasks.

9686. **FREEZER, Tagliabue Oil**, for determining the congealing point of oils. Consists of an oil-cooling chamber, containing a receiver mounted on a rocking shaft to facilitate the introduction of the oil cup and to show whether congealing is taking place; and an ice chamber with drain faucet, surrounded by a heavy insulating jacket. A glass door enables the operator to observe the operation at all times. Two stop-cocks are connected with the oil-cooling chamber to enable air to be blown through to control the temperature. Complete as described with three special standard angle thermometers. \$52.80

Note:—This instrument is furnished to order only and we can not promise immediate delivery.

GAGE RODS, FOR DETERMINING CAPACITY OF BARRELS

9692. **GAGE ROD**, of seasoned maple, 36 inches long. 1.00
9694. **GAGE ROD**, of seasoned lancewood, 36 inches long, with steel point, ivory face, brass back and indicating slide, graduated to 120 gallons 5.77
9696. **GAGE ROD**, similar to No. 9694, but made to fold to 18 inches. 6.16
9698. **GAGE ROD**, of solid tool steel, with hardwood handle, ivory face, and indicating slide, graduated to 120 gallons. 9.90

HYDROMETERS, for Oil Testing, see general heading Hydrometers.

9706. **LUBRICATION TESTER, Thurston's**, for testing the lubricating quality of oils by means of the friction of a bearing on a rotating shaft. A heavy pendulum measures by its deviation the friction. The machine automatically records the pressure per square inch, the total pressure on the journal, the total friction and the temperature of the bearing. F. O. B. . . . Philadelphia 350.00

Note:—This instrument is furnished to order only and we cannot promise immediate delivery.

9710. **MANUAL for Inspectors of Petroleum**, containing correction tables for hydrometers, enabling the true gravity at any temperature to be determined at a glance. 20

9714. **MELTING POINT TESTER, Tagliabue's for Wax**. Requires only a teaspoonful of material and enables a test to be made in $\frac{1}{20}$ of the usual time. Complete with two standard thermometers. 26.40

Note:—This instrument is furnished to order only and we cannot promise immediate delivery.



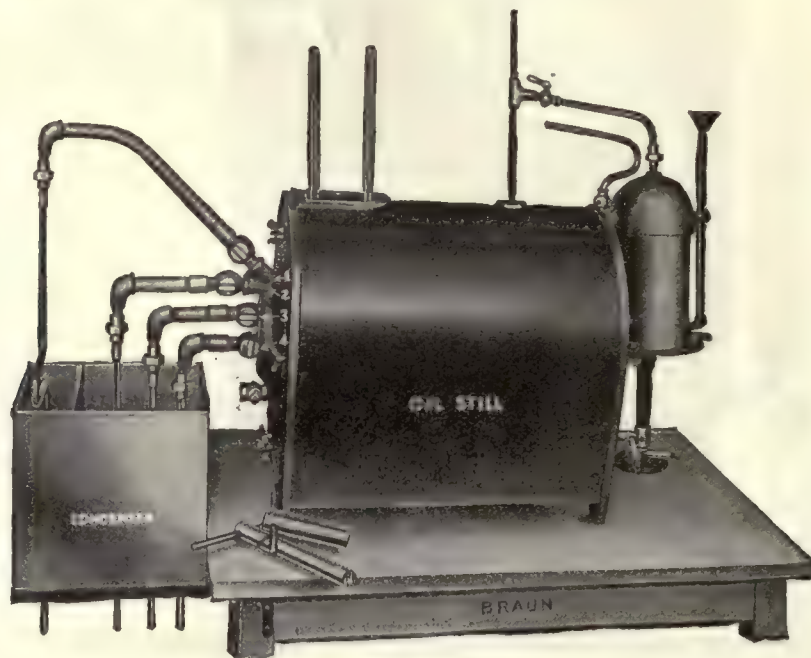
No. 9714.



No. 9716.



No. 9724.



No. 9730.

9716. **MELTING POINT TESTER**, for Wax, consisting of a glass cup for the wax to be tested, with a removable metal top in which is set a thermometer graduated from 90° to 150°F., in $\frac{1}{4}$ ° divisions. The melted wax is poured into the cup until it stands at an indicated level. The cap with thermometer is then put in place and the instrument shaken until the wax shows signs of congealing. The thermometer is then observed and the temperature at which the mercury remains constant while the process of congealing continues is noted as the melting point. By means of this instrument the melting point of a wax may be measured within $\frac{1}{4}$ °F. Complete as described with nicked trimmings and with thermometer..... \$10.00
9720. **OIL TABLES**, Tycos, containing all the data concerning gravities, temperatures, conversion tables, etc., which are of interest to the oil man 1.00
9724. **OIL TUBE**, Muter's, for determining fatty acids in oils and fats. Graduated from 0 to 100 cc in 1 cc divisions, with ground stopper and stop-cock, on wooden support. (See Journal of Association of Official Agricultural Chemists, Vol. II, No. 3, for November 15, 1916, page 309) 5.50

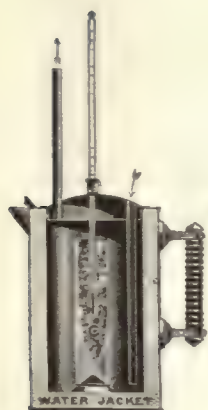
SAMPLE BOTTLES, for Oil, see general heading **Bottles**.

SEPARATORY FUNNELS, see general heading **Funnels**.

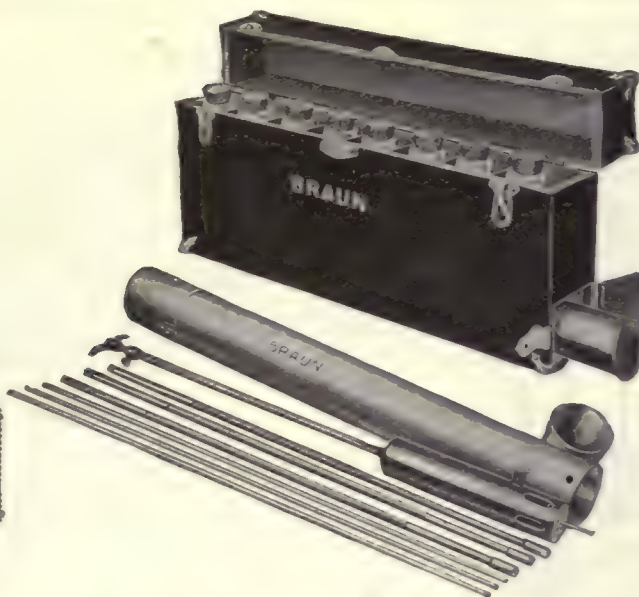
9730. **STILL**, Brown Oil, for fractionations and general distillations, constructed to meet the most exacting requirements. The still is made of cast iron surrounded by a cast iron frame, mounted inside of a fire-brick furnace of the same general shape. The flame from the Bunsen burners plays between the frame surrounding the still and the fire-brick furnace. The still proper is heated only by heat which passes through the walls of the iron frame surrounding it. By this construction the top and bottom of the still may be kept at the same temperature; or, if desired, the top can be kept heated to a higher temperature, or vice versa, by a slight adjustment of the flame entering the fire chamber. It is necessary when running an emulsified oil to keep the top of the still somewhat hotter than the bottom. The still permits the use of a sample sufficient in size to afford cuts that can be treated or otherwise examined; and it fractionates where fractionation is desired. Two large Bunsen burners are included; one for heating the still, and one for generating steam. Capacity of still, one gallon (half full). Complete as described with four vapor lines and discharge pipes, condenser with four compartments, discharge outlet, steam generator and super-heater, Bunsen burners, three thermometer openings and large opening for cleaning purposes, with directions for use..... 135.00

For other **STILLS** for Oil, see general heading **Distilling Apparatus**.

STOP WATCHES, see general heading **Stop Watches**.



No. 9738.



No. 9742.



No. 9748.

9738. **TESTER, Mackey's Spontaneous Combustion**, for testing oils or oily mixtures for liability to produce spontaneous combustion. The apparatus consists essentially of a double walled cylindrical copper water bath with asbestos packed cover, carrying two air circulation tubes. Height inside, 7 inches; diameter inside, 4 inches. Complete with thermometer reading from 0° to 250°C., 6 wire gauze cylinders, 1 pound absorbent cotton, Bunsen burner, support stand and 50 cc graduated cylinder..... \$25.00

THERMOMETERS, see general heading Thermometers.

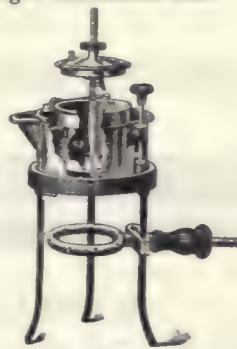
9742. **THIEF, Blackmar Oil**, for taking samples from either top, center or bottom of tank cars, or other storage vessels. The receptacle remains closed until the desired point is reached, when by dropping a lever it fills up and the oil is held intact until delivered into a container. The instrument will take 8-ounce samples and operate to a depth of 12 feet. Oil thief is in a zinc case, complete with 8 eight-ounce cork stoppered bottles fitted into separate compartments in a substantial carrying case 25x11x3½ inches, with lock and handle..... 32.00
9743. **THIEF, Blackmar Oil**, only of No. 9742, in zinc case 16.00
9746. **THIEF, Glass, for Oil**, simple form with rubber bumper..... 2.85
9748. **THIEF, Morrison Oil**, consisting of a heavy glass tube with a capacity of 12 ounces, mounted in a brass frame with special valve at the bottom, which is automatically closed by striking an adjustable nut when the proper depth is reached. In this way correct samples may be taken at any depth. Complete with depth rod permitting samples to be taken at any depth up to 4 feet from the bottom of the tank..... 17.00

Note:—Longer rods may be secured with No. 9748 at a slight additional cost.



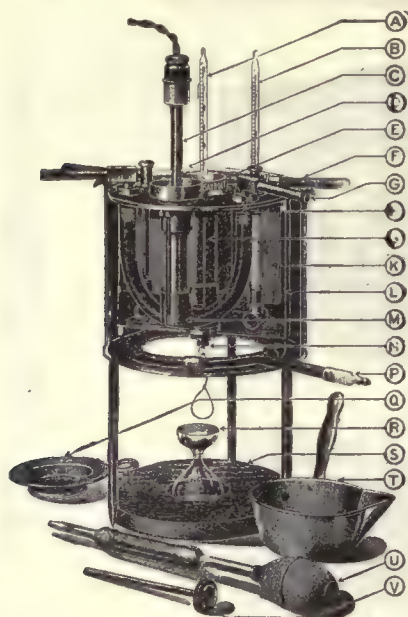
No. 9756.

VISCOSIMETERS

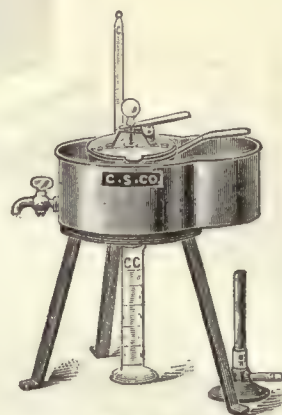


No. 9758.

9756. **VISCOSIMETER, Engler**, latest form, for light and heavy oils. Consists of gold-plated oil cup with platinum outlet tube, surrounded by brass water bath. Complete with two standard thermometers 10° to 50°C. and 10° to 150° C., flask graduated at 200 cc, and tripod with ring burner..... 75.00
9758. **VISCOSIMETER, Engler, Modified by Ubbelohde**, with double walled lid, oil bath totally immersed, stirring arrangement and a device for controlling the size of the outlet opening. Complete with two standard thermometers 10° to 50°C. and 10° to 150°C., 200 cc flask with two marks and tripod with ring burner..... 90.00



No. 9760.



No. 9766.

9760. **VISCOSIMETERS, Saybolt Universal**, improved model adapted for steam, gas, or electric heating. For testing cylinder, valve and similar oils, with bath at 212°F., and oil at 210°F.; reduced black oils with bath and oil at 130°F.; and neutral spindle, paraffine, red and other distilled oils, with bath and oil at 100°F., or at any temperature from 70° to 212° F. Complete with 605-watt electric immersion heating device, U tube steam heater, gas burner, turntable stirring arrangement, six thermometers, graduated flask, and with connecting cord and attachment plug, as illustrated, without stop watch.

No.	A	B
For volts	110	220
Each	\$75.00	75.00

12954. **STOP WATCH** for No. 9760..... 11.00

9761. **FLASK** for No. 9760, graduated at 60 cc..... 2.50

9762. **THERMOMETERS** for No. 9760, solid stem, engraved scale.

No.	A	B	C
Range, degrees F.	70 to 110	100 to 140	180 to 220
Each	3.60	3.60	3.60

9766. **VISCOSIMETER, Scott**, for thin or viscous liquids. Each instrument is standardized and has stamped upon the handle the time in seconds and fractions for 50 cc of distilled water at 70°F., to be discharged. Complete with accurate thermometer graduated to 212°F. in single degrees, 50 cc graduated cylinder, and with instructions for use, but without burner.. 20.00

9767. **THERMOMETER** for No. 9766, graduated from 50° to 120°F., in 1/2° divisions, for use with lubricating oils..... 8.25



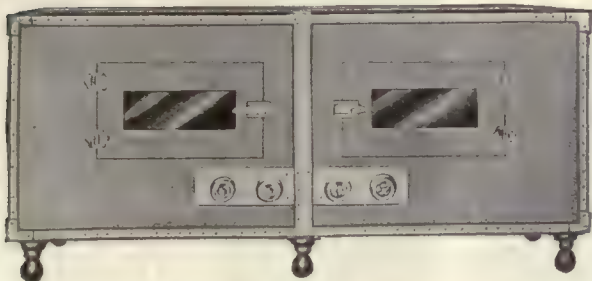
No. 9774.



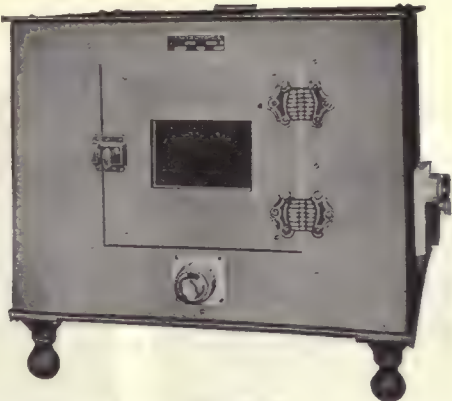
No. 9780.

WANTAGE RODS FOR OIL BARRELS

9774. **WANTAGE ROD, Four Line**, of seasoned boxwood, for determining the quantity of liquid which a barrel lacks of being completely filled. With scales for four different sized barrels, two for half barrels and two for full barrels 1.65
9776. **WANTAGE ROD**, of seasoned boxwood, for use in 55-gallon steel barrels..... 1.32
9780. **WATER INDICATOR and Oil Sampler**, combined, for accurately measuring the depth of water in the bottom of a tank, and at the same time obtaining a sample. Length of tube, 12 inches. Complete with 50 strips of indicating paper 9.90
9781. **WATER INDICATING PAPER**, in 12-inch strips, for use with No. 9780...per 100 strips 1.50
- OINTMENT JARS**, see Jars.
- OSMOSIS APPARATUS**, see general heading **Physical Chemistry Apparatus**.



Nos. 9800-1.



No. 9808.

OVENS, ELECTRIC BAKING

OVENS, Baking, Despatch Electric, large size, specially designed for testing in flour mill and baking laboratories where accurate and uniform baking is desired, but useful for any purpose requiring temperatures up to 500°F. or 260°C. They are made of polished steel with angle iron corner construction; have two-inch solid heat-retaining walls of asbestos throughout, two doors with double glass observation windows, two ventilators in top and bottom; and are equipped with Despatch Open Wire Electric Heaters, wound with a special alloy wire which does not oxidize nor become brittle. These ovens have vitrified tile inner top and hard asbestos floor plates. All corner work, legs and trimmings are highly polished and nickel-plated. The ovens require about 1½ hours to heat to 500°F., then the current should be shut off and baking accomplished without further use of current, except in regulating and holding the heat at certain temperatures as desired. They are practically cool outside when in use and there is absolutely no danger of fire. All sizes are 22 inches deep and 27 inches high outside, and have a baking space 18 inches deep and 11 inches high.

No.	100	125	135
Length outside, inches.....	44	60	72
Baking space length, inches.....	40	56	68
Size of doors, inches.....	11x14	11x16	11x20
Regulating switches.....	2	3	4
Max. current consumption, watts.....	2600	3800	4700
9800. For 110 volts.....	\$160.00	185.00	250.00
9801. For 220 volts.....	160.00	185.00	250.00

OVENS, Baking, Despatch Electric, of same construction as No. 9800, but smaller, with one door. The door is fitted with double plate glass observation windows. A three heat switch system gives the operator control by means of which the heat can be held at any desired temperature indefinitely, with a very low current consumption. The tile top with which the baking space in these ovens is made contributes not only to low current consumption, but supplies the place of a top heater and tends to uniformity of heat throughout the baking space.

No.	400	402
Outside dimensions, inches.....	18x20x22	24x19x22
Baking space, inches.....	14x9x18	20x10x18
Size of doors, inches.....	9x12	10x12
Removable shelves	1	2
Current consumption, watts.....	500 to 1400	600 to 1800
9804. For 110 volts.....	100.00	110.00
9805. For 220 volts.....	100.00	110.00

9808. **OVENS, Baking, Despatch Electric No. 90,** designed to meet the requirements of the small laboratory for test baking. This oven is intended for use in connection with Proofing Cabinet No. 5982, but may be used for any purpose requiring an electrically heated oven capable of furnishing a temperature up to 500°F. Constructed of polished steel with double walls packed with mineral wool, top and bottom heaters arranged for three heats, and glass observation door. Depth of heating space, 12 inches; length, 20 inches; height, 11 inches; current consumption on high heat, 1000 watts; on medium heat, 500 watts; on low heat, 250 watts. Capacity, 4 loaves.

No.	A	B
For volts.....	110	220
Each	60.00	60.00



9812. **OVENS, Baking, Hughes Electric.** The walls and the doors have an insulation 2 inches thick, and the construction of the door makes it practically heat tight. The oven is provided with a three point switch, giving a current consumption of 165, 330 and 660 watts. A temperature of 450°F. is reached in 20 minutes, and a maximum temperature of 600°F. may be attained, which may then be maintained indefinitely with the switch at low heat. Inside dimensions, 11x11x9 inches. Shipping weight, 55 pounds. Complete with temperature indicator, attachment plug and cord.

No.	A	B
For volts.....	110	220
Each	\$16.00	16.00

9814. **OVENS, Baking, Hughes Electric, with temperature control.** This oven is the same as No. 9812 except that it has no three point switch, but is provided with a mercury thermostat which may be set at any temperature from room temperature up to 600°F. Complete with temperature indicator, attachment plug and cord, thermostat, pilot light and tubulature for thermometer, but without thermometer.

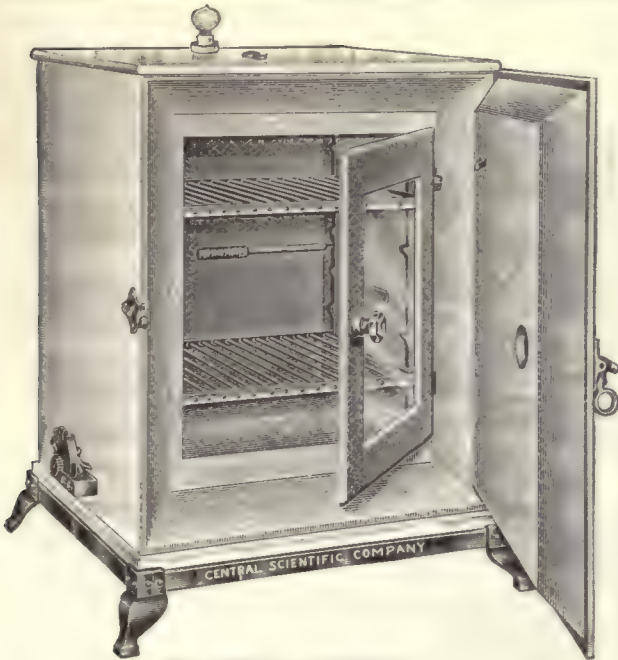
No.	A	B
For volts.....	110	220
Each	32.50	32.50

9816. **OVENS, Baking, Hughes Electric,** similar to No. 9812, but of better construction, with nickel-plated legs and trim, and with the face of the door finished in white enamel. The oven has two heating units, one each at top and bottom, controlled by separate switches, giving 9 degrees of heat. Each burner consumes 220, 440, and 880 watts at low, medium and high heats. A maximum temperature of 600°F. may be obtained, of which 450°F. is reached in 15 minutes, and the oven is so well insulated that it has been found on a pyrometer test that a baking temperature will be maintained for an hour after the heat has been completely turned off. Inside dimensions, 18x12x12 inches. Shipping weight, 100 pounds. Complete with temperature indicator, attachment plug and cord.

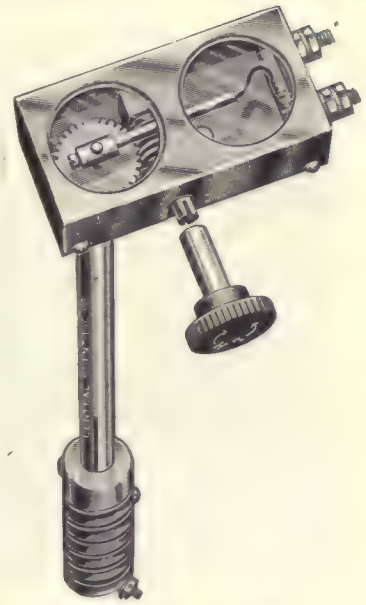
No.	A	B
For volts.....	110	220
Each	45.00	45.00

9818. **OVENS, Baking, Hughes Electric,** same as No. 9816 Oven, but with inside measurements 18x16x12 inches. Each burner consumes 275, 550 and 1,100 watts at low, medium and high heat respectively. Shipping weight, 125 pounds.

No.	A	B
For volts.....	110	220
Each	48.25	48.25



Nos. 9830-1 (Patented).

DeKhotinsky Bimetallic Thermo-Regulator.
(Patent applied for.)

OVENS, DRYING, ELECTRICALLY HEATED AND REGULATED

OVENS, Drying, Triple Wall, DeKhotinsky, Electrically Heated and Regulated (Patented), with new bimetallic regulator and new system of ventilation providing for greatest possible uniformity of temperature throughout the oven chamber.

Construction: These ovens are constructed of asbestos board on a steel frame, with three walls. The space between the outer walls is packed with magnesia-asbestos (magnesia 85 per cent.; asbestos 15 per cent.) Between the inner walls is an air space through which the air passes upward from the heating units in the base. Ports are provided in the side walls of this air space, permitting the entrance of the heated air to the oven chamber, in which it passes up and out through an opening in the false top. The location of these ports has been carefully and scientifically determined so as to provide a continuous current of heated air to every corner of the inner chamber, making the temperature uniform throughout. This feature (patent pending) is peculiar to the DeKhotinsky Triple Wall Oven, and insures a uniformity not possible in electrically heated ovens of any other type. The outer door is double walled and packed with magnesia-asbestos. It is beveled on the edges, making close contact, when closed, with the walls, thus preventing leakage of heat. An inner glass door is provided for inspection of the interior without cooling the contents. Between it and the outer door is a dead air space for insulation purposes.

Heating of the oven is effected by means of four of our standard heating units of chromel wire wound on lavite. These heating units are located in the base of the oven between the two bottoms with an iron deflector placed over them to prevent radiation of heat from the units into the inner chamber. Three of these heating units are connected in parallel to the switch contact springs, and may be added to the circuit one at a time as desired. The fourth is connected in circuit with the contact points of the thermo-regulator. These heating units can be easily and quickly replaced from outside the oven without the necessity of opening the door or stopping the operation.

Temperature control of the oven is secured by means of our new bimetallic thermo-regulator which is made from invar-brass ribbon, and can be set at any desired temperature from that of the surrounding air up to the maximum heat capacity of the oven. This range of temperature permits the use of these instruments as ovens, paraffine baths, or sterilizers. The precision of action of this thermo-regulator is $\frac{1}{4}^{\circ}\text{C}$. The make-and-break contact of the thermo-regulator is located outside the oven to prevent the possibility of ignition of inflammable gases developed in the inner chamber, which often occurs when the contact is made and broken inside. A pilot lamp on top of the oven is connected in series with the thermo-regulator, enabling the operator to determine at a glance whether the oven is regulating.

These instruments can be operated on either A.C. or D.C. circuits.

No.	A	B	C
Height inside, inches.....	10 $\frac{1}{2}$	14 $\frac{3}{4}$	19 $\frac{3}{4}$
Width inside, inches.....	7	12	17
Depth inside, inches.....	6 $\frac{1}{2}$	11 $\frac{3}{4}$	14
Shelf space, square inches.....	91	282	476
For 110 volts.....	\$55.00	90.00	145.00
For 220 volts.....	57.50	92.50	147.50

9830.
9831.



Nos. 9846-7 (Patented).

OVENS, Drying, Triple Wall, DeKhotinsky, Electrically Heated and Regulated, same as No. 9830, but provided with our standard DeKhotinsky mercury thermo-regulator sensitive to $\frac{1}{10}^{\circ}\text{C}.$, and our sensitive iron clad relay, for controlling the temperature. We recommend this equipment for research work requiring close temperature regulation where careful attention can be given to the care of the regulator, as its supersensitiveness to temperature changes renders it less suitable for routine work than the bimetallic regulator supplied with Nos. 9830-1.

	No.	A	B	C
9834.	For 110 volts A.C.....	\$67.50	102.50	157.50
9835.	For 220 volts A.C.....	70.00	105.00	160.00
9836.	For 110 volts D.C.....	65.00	100.00	155.00
9837.	For 220 volts D.C.....	67.50	102.50	157.50

EXTRA HEATING UNITS for Nos. 9830 to 9837.

	No.	B	D	E
	For oven No.....	A	B	C
	Wattage	60	115	140
7526.	For 110 volts.....	1.00	1.00	1.00
7527.	For 220 volts.....	1.25	1.25	1.25

FUSES for Nos. 9830 to 9837, enclosed cartridge type, 250 volts.

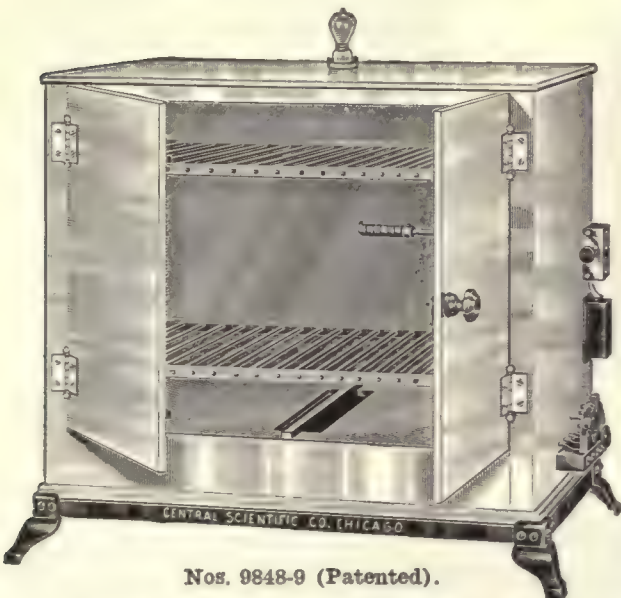
	For size.....	A-B	C
	Amperes	6	10
	Each .....	.15	.15

Note:—We shall be glad to quote prices on request upon our DeKhotinsky Electrically Heated and Regulated Drying Ovens for temperatures higher than $180^{\circ}\text{C}.$ Kindly specify both maximum and minimum temperatures at which they are to be used.

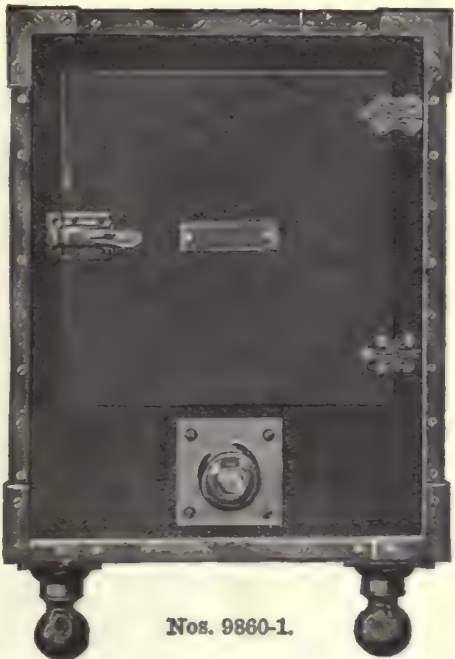
OVENS, Drying, Single Wall, DeKhotinsky, Electrically Heated and Regulated (Patented), with new bimetallic regulator and new system of ventilation providing for greatest possible uniformity of temperature throughout the oven chamber obtainable in a single walled drying oven. For work requiring the greatest precision of regulation and uniformity of temperature, we recommend our DeKhotinsky Triple Wall Drying Oven. (See description under No. 9830.)

Construction: The oven is built of $\frac{1}{4}$ -inch asbestos board on a steel frame with a foundation of $\frac{3}{8}$ -inch asbestos board. To effect the greatest uniformity of temperature possible in an oven of the single walled type, the heating units are placed between two bottoms, the upper bottom being protected from the direct heat of the units by an iron deflector. Air heated by the units passes back between the bottoms, up through the space between the double back to the upper part of the oven, and after circulating through the oven chamber returns to the inter-bottom space by way of an opening in the front part of the false bottom. This feature (patent pending) is peculiar to the DeKhotinsky Single Wall Drying Oven and insures a uniformity not possible in other types. Two shelves of the grid type are provided, which, by means of racks, may be set at any desired height. The oven is mounted on a japanned steel base.

Heating of the oven is effected by means of six of our standard heating units of 115 watts each, two of which are permanently connected to the connecting receptacle of the oven, three to the switch contact springs, and the remaining one—the heat-regulating unit—is in circuit with our bimetallic thermo-regulator for automatic control of the desired temperature. The system is fused for protection.



Nos. 9848-9 (Patented).



Nos. 9860-1.

OVENS, Drying, Single Wall, DeKhotinsky, Continued.

Temperature Control: Our new bimetallic thermo-regulator is made from invar-brass ribbon, and can be set at any desired temperature from that of the surrounding atmosphere to the maximum heat capacity of the oven, about 140°C. The precision of action of this thermo-regulator is ¼°C. The make-and-break contact of the thermo-regulator is located outside the oven to prevent the possibility of ignition of inflammable gases developed in drying, which often occurs when the contact is made and broken inside the oven. A pilot lamp on top of the oven is connected in series with the thermo-regulator, enabling the operator to determine at a glance whether the oven is regulating.

These ovens can be operated on either A.C. or D.C. circuits.

DRYING OVENS, Single Wall, DeKhotinsky, Electrically Heated and Regulated, as described above, complete with two extra cartridge fuses, Hubbell receptacle, and 5 feet of flexible asbestos covered cord with separable Hubbell attachment plug.

	Width, Inches	Depth, Inches	Height, Inches	Vol. Inside, Cu. Inches	Shelf Space, Sq. Inches	Voltage, A.C. & D.C.	Price
9846.	11	10	12	1320	220	110	\$40.00
9847.	11	10	12	1320	220	220	42.50

DRYING OVENS, Single Wall, DeKhotinsky, Electrically Heated and Regulated, of same construction as No. 9846, but larger, with two doors and with eight 115-watt heating units. With same equipment as No. 9846.

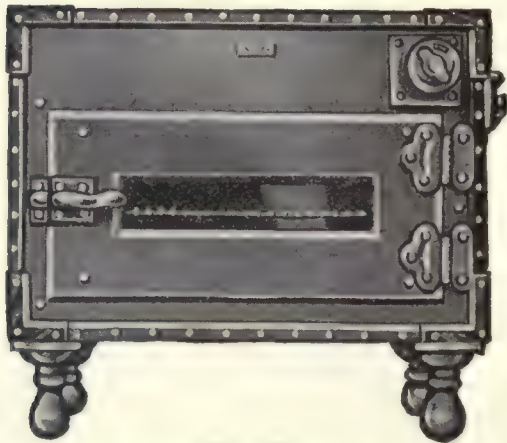
	Width, Inches	Depth, Inches	Height, Inches	Vol. Inside, Cu. Inches	Shelf Space, Sq. Inches	Voltage, A.C. & D.C.	Price
9848.	18	12	14	3024	430	110	60.00
9849.	18	12	14	3024	430	220	62.50

EXTRA HEATING UNITS for Nos. 9846 to 9849, 115 watt capacity. No. 7526D 7527D
For volts 110 220
Each 1.00 1.25

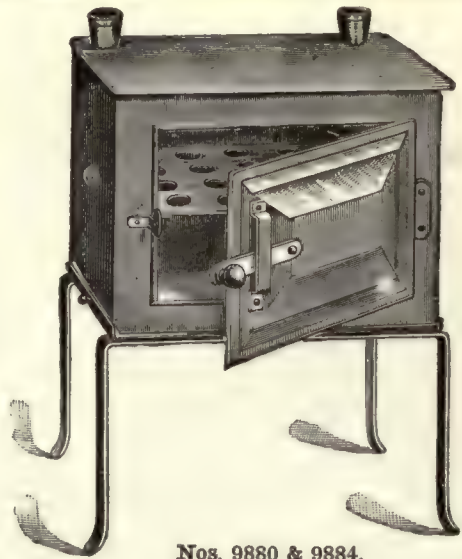
9850. **FUSES,** for Nos. 9846 to 9849, enclosed cartridge type, 250 volts. No. A B
Amperes 10 15
Each15 .15

OVENS, Drying, Despatch Electric, especially designed for moisture determinations in soils, flour, etc. They are practically uniform in temperature, having a three-point regulating switch, whereby the temperature can be held at 212°F. Provided with top and bottom ventilators, which greatly expedite the drying process. Made of polished steel with angle iron corner construction, and with all fittings nickel-plated, with 1-inch solid heat retaining walls of asbestos, and Despatch Open Wire Electric Heaters, wound with special alloy which will not oxidize nor become brittle. Complete with four removable screen shelves and tested thermometer. No. A B C

	A	B	C
Outside dimensions, inches.....	14x14x18	14x16x18	16x20x20
Inside dimensions, inches.....	11x6x16	12x9x16	13x12x18
Size of door, inches.....	6x11	9x11	12x13
Number of shelves.....	2	3	4
Current consumption first heating, watts.....	200	200	250
Current consumption continuous, watts.....	100	100	150
9860. For 110 volts.....	75.00	80.00	85.00
9861. For 220 volts.....	75.00	80.00	85.00



No. 9870.



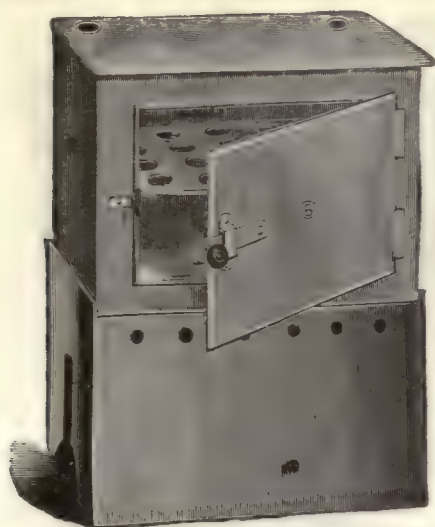
Nos. 9880 & 9884.

OVENS, Drying, Despatch Electric, similar to No. 9860, but with two compartments, either of which may be used separately if desired, since they are non-interfering. Drying space of each compartment: 20 inches wide, 16 inches high, and 18 inches deep; size of doors, 16x20 inches; maximum power consumption of each compartment, 150 watts.

	No.	A	B
	Outside dimensions, inches.....	50x24x22	72x24x22
	Number of compartments.....	2	3
9864.	For 110 volts.....	\$215.00	270.00
9865.	For 220 volts.....	215.00	270.00
9868.	OVENS, Drying, Despatch Electric , similar to No. 9860, but with three compartments. Widely used for sulphite tests in pulp mills. Outside dimensions, 60x21x24 inches deep; inside dimensions of each chamber, 14x9x20 inches; power consumption of each compartment, 100 watts.		
	No.	A	B
	For volts.....	110	220
	Each	280.00	280.00
9870.	OVENS, Drying, Despatch Electric , for moisture determinations in soil, flour, etc. Of special value in milling laboratories for Pekar slick tests. Similar in construction to that of No. 9860, but with observation window in the door so that tests can be watched without opening oven. Being small and compact this oven can be easily moved and can be operated anywhere. Connection can be made with ordinary lamp socket. Outside dimensions: 18 inches wide, 14 inches high, 10 inches deep; drying space, 16 inches wide, 7 inches high, 8 inches deep; with three heats, consuming 75, 150 and 300 watts respectively.		
	No.	A	B
	For volts.....	110	220
	Each	45.00	45.00

OVENS, DRYING, FOR GAS OR OIL HEAT

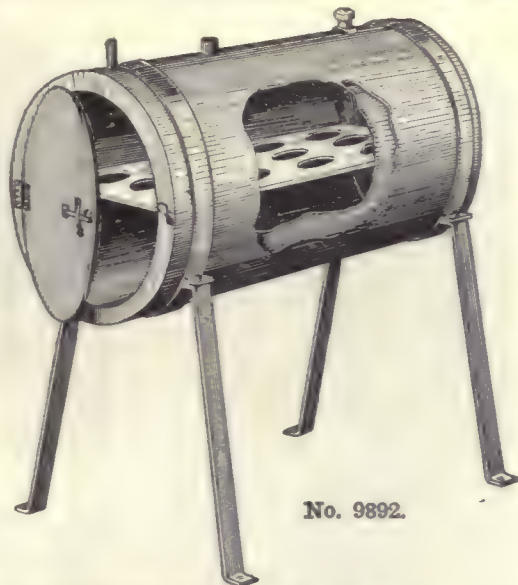
9880.	OVENS, Drying, Single Wall , of heavy polished copper with tubulations for thermometer and gas regulator, mounted on heavy cast iron support with false bottom of sheet iron to protect the copper. With two removable perforated shelves.				
	No.	A	B	C	D
	Outside dimensions, inches.....	6x8x6	8x10x8	10x12x10	18x24x18
	Each	8.00	10.00	14.00	44.00
9882.	OVENS, Drying, Single Wall , same as No. 9880, but with enclosed sheet iron base.				
	No.	A	B	C	D
	Outside dimensions, inches.....	6x8x6	8x10x8	10x12x10	18x24x18
	Each	9.00	11.50	16.00	47.50
9884.	OVENS, Drying, Double Wall , same as No. 9880, but with water jacket, with tubulations for thermometer and gas regulator. With two shelves.				
	No.	A	B	C	
	Outside dimensions, inches.....	6x8x6	8x10x8	10x12x10	
	Inside dimensions, inches.....	4 1/4 x 6 1/4 x 5 1/4	6 1/4 x 8 1/4 x 7 1/4	8 1/4 x 10 1/4 x 9 1/4	
	Each	10.00	14.00	22.00	
	No.		D	E	
	Outside dimensions, inches.....		18x24x18	18x36x18	
	Inside dimensions, inches.....		16 1/4 x 22 1/4 x 17 1/4	16 1/4 x 34 1/4 x 17 1/4	
	Each		60.00	90.00	



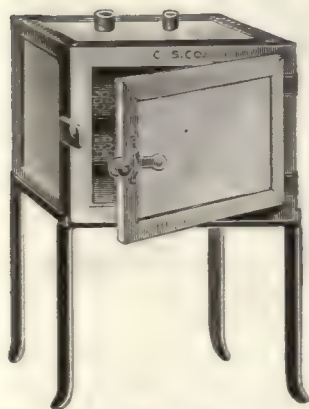
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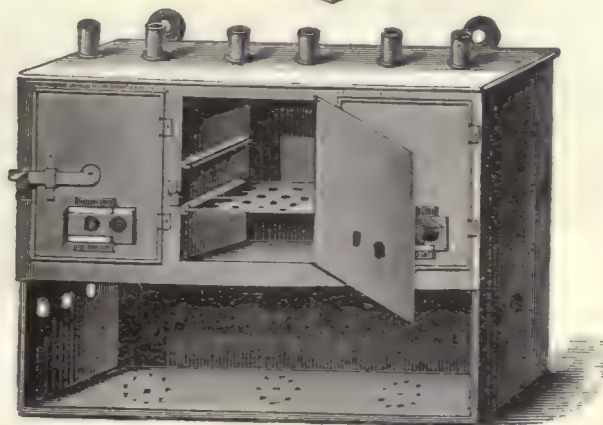
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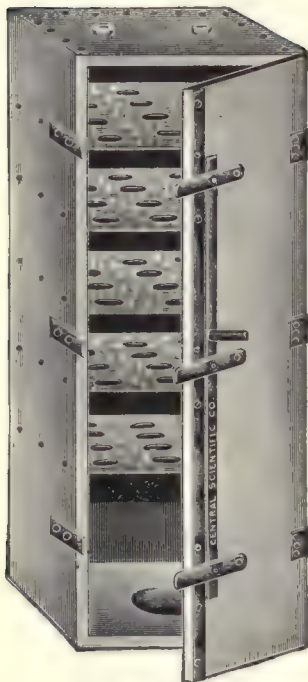


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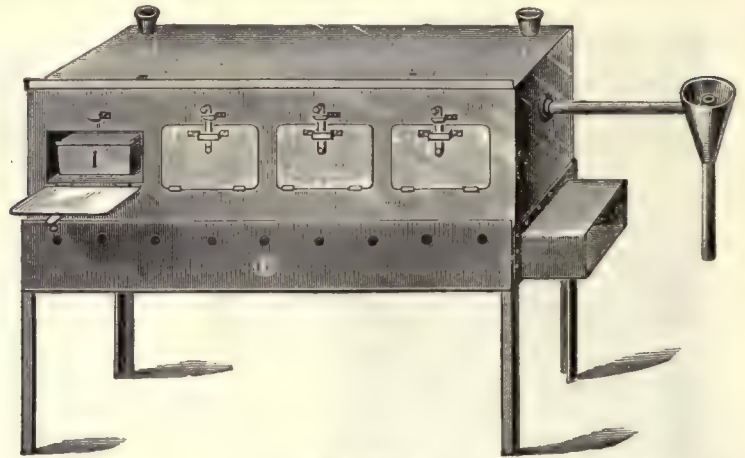


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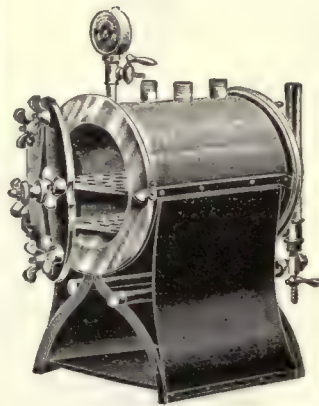
9886. **OVENS, Drying, Double Wall**, same as No. 9884, but with enclosed sheet iron base.
- | No. | A | B | C | D | E |
|---------------------------------|---------|--------|----------|----------|----------|
| Outside dimensions, inches..... | 6x8x6 | 8x10x8 | 10x12x10 | 18x24x18 | 18x36x18 |
| Each | \$11.00 | 15.50 | 24.00 | 63.50 | 95.00 |
9887. **WATER GAGE**, fitted to any Double Wall Drying Oven Nos. 9884-6.....add 2.00
9888. **WATER LEVEL, Kekule**, fitted to any Double Wall Drying Oven Nos. 9884-6.....add 3.00
9890. **OVEN, Drying, Double Wall**, for high temperatures, similar to No. 9884, but of extra heavy copper with all seams brazed. May be used with oils or glycerine to furnish temperatures up to 300°C. Height inside, 8 inches; width inside, 10 inches; depth inside, 9 inches. With heavy cast iron support stand..... 55.00
9892. **OVEN, Drying, Double Wall**, for moisture in coal, according to designs of the United States Bureau of Mines. Made of copper double walled, with space for a solution of glycerine in water of specific gravity 1.19 at 15°C., which will maintain a temperature of 105°C. in the oven space. The door is double walled with air space for insulation. To hasten drying, a current of air, dried by passing through concentrated sulphuric acid, and preheated by passing through a copper tube encircling the inner chamber between the walls, is forced over the samples and allowed to escape through a small opening in the door. With removable shelf perforated to take No. 3166 Porcelain Capsule, openings for thermometer and gas regulator, mounted as shown. (See Technical Paper No. 8 of the United States Bureau of Mines, page 13) 40.00
- CONDENSER, Soxhlet**, for use with Oven No. 9892, see **Condensers**.
9894. **OVEN, Drying, Single Wall**, of copper covered throughout with asbestos, as used in tar and pitch testing. Size, 8x10x8 inches..... 19.00
9896. **OVEN, Drying, Single Wall**, with three compartments. Made of heavy polished copper, 21 inches long, 8 $\frac{1}{4}$ inches high, 7 inches deep; with three chambers, each 7 inches deep and 7 inches wide; with separate doors, ventilators, and two tubulatures for each chamber. Provided with sheet iron back and support, arranged for table or wall..... 33.00



No. 9900.



No. 9904.



No. 9922.

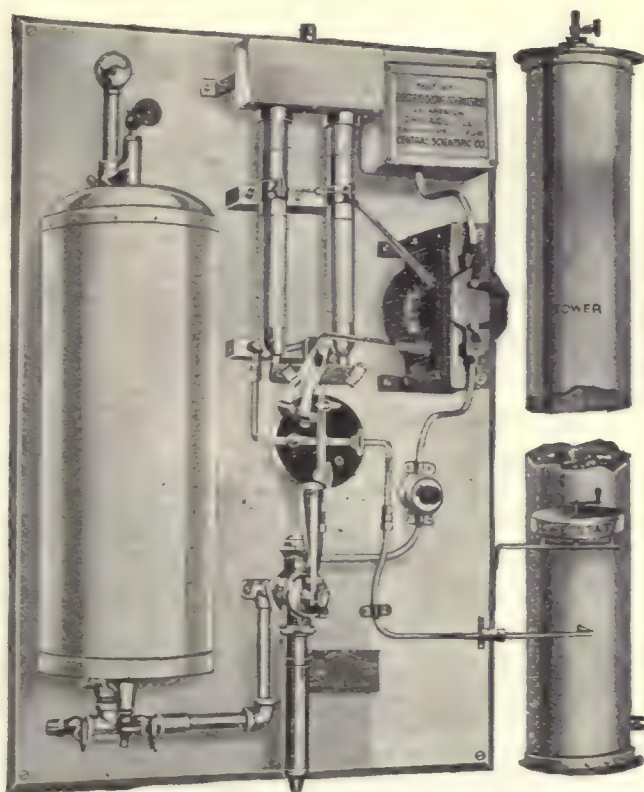


No. 9924.

9900. **OVEN, Drying, Single Wall, Asbestos**, of the type used in the United States Bureau of Soils. Substantially made of heavy asbestos board, 13 inches deep, 18 inches wide, and 48 inches high. Openings are provided at the top for thermometer and gas regulator and near the bottom for gas inlet tube. Very satisfactory for drying large quantities of soil samples. Complete with 5 removable shelves of woven wire \$65.00
- Ovens, Drying, for Asphalt Testing**, see Nos. 360 and 361.
9904. **OVEN, Drying, Double Wall, Dr. Blair's**, as used in iron ore analysis. Of heavy sheet copper, double walled, with tubulations and constant water level. Provided with four compartments, $4\frac{1}{2} \times 6 \times 2\frac{1}{2}$ inches, and with 4 numbered copper boxes, $4 \times 4\frac{1}{2} \times 1\frac{1}{2}$ inches, to fit in same. Dimensions over all: length, 24 inches; height without support, 7 inches; total height, 19 inches; depth, 7 inches. Mounted on sheet iron base with legs..... 44.00
- OVEN, Alsop's Steam Drying**, see Nos. 14290-1.
9922. **OVEN, Vacuum Drying, Double Wall**, for steam or gas heating. Used extensively by the United States Department of Agriculture, sugar laboratories, etc. Made of heavy drawn brass tubing tinned inside, with outer jacket separated by 1 inch of steam space. The heavy hinged door is ground to fit the flange of the oven and provided with six thumb screws. Diameter inside, 8 inches; depth, 16 inches. Complete with soft rubber gasket for door, two perforated shelves, two $\frac{1}{4}$ -inch perforated pipes for introducing moisture, two perforated pipe burners for gas, a constant level arrangement for water with shut-off cock, a nipple connection for steam, a draw-off cock for condensed steam, openings for thermometer and for withdrawing air, and with vacuum gage, mounted on angle iron frame incased in sheet iron 250.00
9924. **OVEN, Vacuum Drying, Double Wall**, used also for drying in a current of hydrogen, etc. Made of heavy copper, with flanged door held by six thumb screws and sealed with rubber gaskets. Can be used with glycerine, toluol, or water in the jacket and for vacuum up to 20 inches. Outside dimensions, 18×10 inches. Diameter inside, $6\frac{3}{4}$ inches; depth, 17 inches. With one shelf and with openings for vacuum connections, gage and thermometer, but without gage or thermometer 66.00

Note:—We shall be pleased to co-operate with our customers in the design and manufacture of constant temperature ovens for special purposes as we maintain a department which is devoted entirely to the development of constant temperature appliances.

9946. **OZONATOR, Electric**, for the production of ozone (O_3) for laboratory and industrial research. This outfit is a practical working machine built for us by the Electric Ozone Sterilizer Co. of America. The ozone producing tubes are the same as those used on the large industrial outfits and all parts are standard. The machine is a combination of the suction and pressure types. For suction an aspirator is furnished and a tower is provided for use whenever the pressure type is needed. The machine consists essentially of a 110 to 5500 volts step-up transformer, two standard vacuum ozone producing tubes, a pressure tank, a mixer with aspirator, an absorption tower, and a rheostat for controlling the voltage. The concentration of ozone can be controlled either by changing the rate of flow of air or by varying the voltage. The various parts are mounted on a white enameled board 22x32 inches with all connections in plain sight. The line wiring is enclosed in aluminum tubing, and the high voltage wiring in glass tubing, to prevent any danger. The tower is five feet high.



No. 9946.

With this outfit and a small force or suction pump such as our No. 1398 or No. 1400, there is available for the research engineer or chemist an ample supply of ozone in any concentration up to six grams per cubic meter of air, and in quantity up to one-half gram per hour per tube. A special valve is provided by which the ozone can be obtained from either one or both of the vacuum ozone tubes, and can be mixed with water, either by a suction system in the mixing valve or by the use of pressure in the absorbing tower, or can be led or forced into any solution desired.

Some of the uses to which this machine can be put, on a laboratory scale, are: the practical sterilization of water; the sterilization of milk; purification of air; sterilization of bottles and containers; disinfection of surgical dressings; bleaching and refining of oils; bleaching of flax, gums, waxes, ivory, bone, feathers and starch; aging wines and liquors; hardening and ripening woods; improving the quality of tobacco; removing undesirable odors from raw coffee; the purification of illuminating gas; and in cold storage experiments, especially in keeping eggs, meat and vegetables.

By means of this machine, all of the above processes can be tested on a sufficiently large scale in the laboratory to enable satisfactory conclusions to be drawn as to the success of the operations when conducted on a practical manufacturing basis.

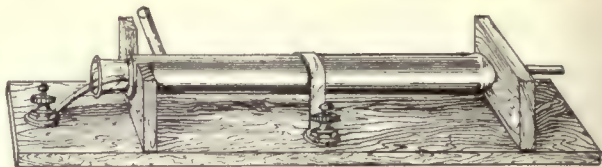
Ozone is a powerful chemical agent for use in organic chemistry, and finds further application in the manufacture of artificial gum arabic; the production of synthetic indigo; the oxidation of turpentine to camphor; the production of artificial perfumes; the manufacture of vanilla extract, etc.. Many other uses will be readily found for this machine in the research laboratories of universities and industrial plants.

Complete as described with high potential transformer, 4 gallon pressure tank, air valve, air pressure gage, two $\frac{3}{8}$ -inch brass cocks, manually operated faucet with electric switch and aspirator, snap switch, two vacuum ozone tubes with switches, four-way tube with four valves, two 1 ampere fuses in white enameled cast iron box, all mounted on white enameled board, and with ozone tower, rheostat and one extra ozone tube, complete with directions for installation and operation.

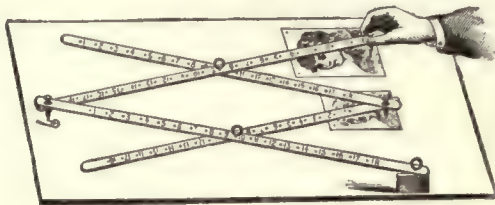
Type	C. A.	C. B.	C. C.	C. D.
	A. C.		D. C.	
For volts	110	220	110	220
Each	\$375.00	\$375.00	450.00	450.00



No. 9930.



No. 9950.



No. 9988.

9930. **OVENS, Despatch Electric, for Temper Drawing, Enameling, Core Baking, etc.,** built of galvanized iron re-enforced at the edges with angle iron and finished in dull black enamel. Equipped with Open-Wire Electric Heaters for temperatures up to 700°F. The walls are double packed with three inches of asbestos for insulation. Provided with switches to control temperature, and with ventilators in top and bottom. Maximum current consumption, 3 kilowatts per hour. Outside dimensions, 32x40x26 inches; inside dimensions, 24x24x18 inches; weight crated, 400 pounds. Complete with 6 shelves of woven wire, re-enforced to prevent sagging.

No.	A	B
For volts.....	110	220
Each	\$145.00	145.00

OVEN THERMOMETERS, see general heading **Thermometers.**

For **OZONATOR, Electric,** see page 389.

9950. **OZONE APPARATUS, Siemens',** for showing the formation of ozone by the discharge of an electric current. Complete with wooden support 7.00

9951. **OZONE TUBE, Siemens',** glass tube only of No. 9950, without foil..... 3.50

9980. **PAILS, White Enameled, Seamless,** with cover of same, for laboratory waste. Capacity, 3 gallons each 2.60

PALLADIUM TUBE, see **Gas Analysis Apparatus.**

PALM GLASS, see **Pulse Glass.**

PANS, Baking, see **Flour Testing Apparatus.**

PANS, Gluten Washing, see **Flour Testing Apparatus.**

PANS, Gold Washing, see Nos. 7284 and 7286.

9988. **PANTOGRAPH** for enlarging or reducing maps, drawings, etc. Brass mounted; black figures on highly polished hardwood; movable point. A very neat and substantial instrument. Furnished complete with pencil holder, but without drawing board 1.50

PAPER, Adams, for Milk Analysis, see No. 9266.

PAPER, Asbestos, see **Asbestos Paper.**

9992. **PAPER, Blue Print, 30 inches wide,** in 10 yard rolls.....Per roll 1.00

9994. **PAPER, Blue Print, in light-proof packages** of 24 sheets.

Size, inches	4x5	5x7	5x8	8x10
Per package .....	.20	.22	.25	.35

9998. **PAPER, Carborundum, in sheets 9x11 inches.**

No.	000	00	0	1
Per sheet .....	.05	.05	.05	.06
Per quire	1.00	1.00	1.00	1.25

10000. **PAPER, Congo Red, in sheets 11x17 inches.**.....Per sheet .06

PAPER, Cross Section, see **Cross Section Paper.**

PAPER, Drawing, see **Drawing Paper.**

PAPER, Emery, see **Emery Paper.**

PAPER, Filter, all kinds, see **Filter Paper.**

10004. **PAPER, Glazed, for collecting filter ashes, etc., in sheets 20x24 inches.**

No.	A	B	C
Color	black	white	yellow
Per quire .....	.60	.40	.60

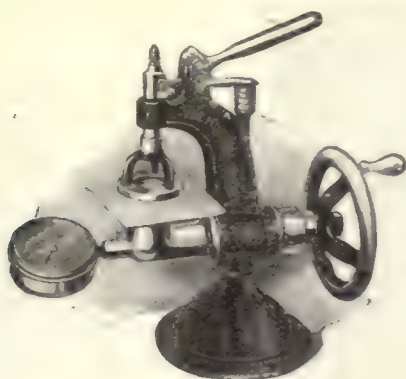
10008. **PAPER, Litmus, blue, in sheets 8x10 inches.**.....Per sheet .05
Per quire .80

10010. **PAPER, Litmus, blue, in books of 50 strips.**.....Per book .06

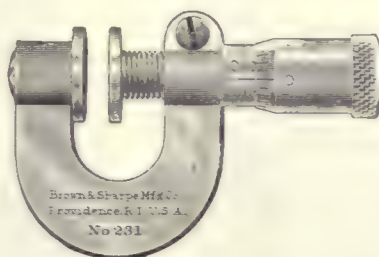
Per dozen books .60

10012. **PAPER, Litmus, blue, in glass vials containing 100 strips.**.....Per vial .10

Per dozen vials 1.05



No. 10076.



No. 10080.

10016. PAPER, Litmus, neutral, in sheets 8x10 inches.....	Per sheet	\$0.05				
	Per quire	1.00				
10018. PAPER, Litmus, neutral, in books of 50 strips	Per book	.06				
	Per dozen	.60				
10020. PAPER, Litmus, neutral, in glass vials containing 100 strips.....	Per vial	.10				
	Per dozen	1.05				
10024. PAPER, Litmus, red, in sheets 8x10 inches.....	Per sheet	.05				
	Per quire	.80				
10026. PAPER, Litmus, red, in books of 50 strips.....	Per book	.06				
	Per dozen books	.60				
10028. PAPER, Litmus, red, in glass vials containing 100 strips.....	Per vial	.10				
	Per dozen vials	1.05				
10032. PAPER, Logwood, in sheets 11x17 inches.....	Per sheet	.05				
	Per quire	1.00				
10036. PAPER, Paraffin, in sheets 12x18 inches.....	Per quire	.20				
10040. PAPER, Parchment, vegetable, in sheets 18x24 inches.....	Per sheet	.05				
	Per quire	.60				
10042. PAPER, Parchment, genuine animal product, in sheets 17x22 inches.....	Per sheet	1.70				
10046. PAPER, Sand, in sheets 9x11 inches.						
No. ....		.00	0	1	2	3
Per sheet .....		.05	.05	.05	.05	.05
Per quire .....		.55	.55	.60	.70	.80
10050. PAPER, Turmeric, in sheets 11x17 inches.....	Per sheet					.06
	Per quire					1.00
10052. PAPER, Turmeric, in books of 50 strips.....	Per book					.06
	Per dozen books					.60
10058. PAPER, Wrapping, genuine Kraft, in rolls.						
No.		A	B	C	D	E
Width, inches.....		9	15	24	30	36
Weight, pounds.....		14	20	29	32	47
Per roll		2.15	3.35	4.50	5.00	7.50
10062. PAPER BAGS, of heavy manila paper with metal clasp which cannot become unfastened. For samples of ore, grain, etc.						
No.				A	B	C
Size, inches.....				4¾x3	5¼x3½	6x4
Per dozen .....				.15	.20	.25
Per 100 .....				.95	1.20	1.40
10064. PAPER BAGS, ordinary quality and style, as used for sugar, etc.						
Capacity, pounds.....		1	2	3	5	8
Per dozen .....	.05	.10	.10	.15	.16	.18
Per 100 .....	.35	.70	.70	1.05	1.15	1.26
10068. PAPER RACKS, with cutter, for No. 10058; to be screwed to table:						
For No.		A	B	C	D	E
Each		2.50	2.55	2.60	2.75	2.80
10076. PAPER TESTER, Mullen, for measuring the bursting strength of paper, cardboard, textiles, etc. By turning the hand wheel, the fluid pressure is applied upon a circular area of 1 square inch, and the pressure required to burst the paper is registered upon the gage in pounds per square inch. A rubber diaphragm prevents the fluid from wetting the paper. This test is required upon all paper purchased by the United States Government.....						115.00
10080. PAPER THICKNESS GAGE. Micrometer Caliper, pocket size, reading from 0 to ¼ inch in thousandths. Very convenient for carrying in the pocket. Length, 2 inches.....						7.75



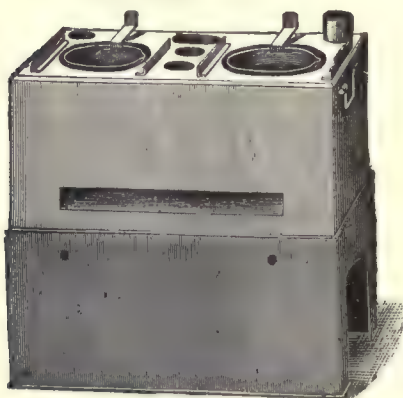
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No. 10086.



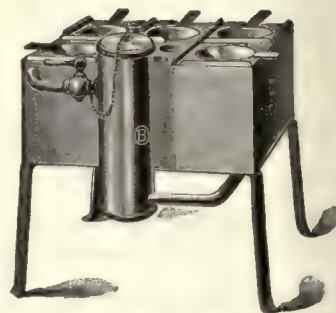
No. 10102.



No. 10100.



No. 10106.

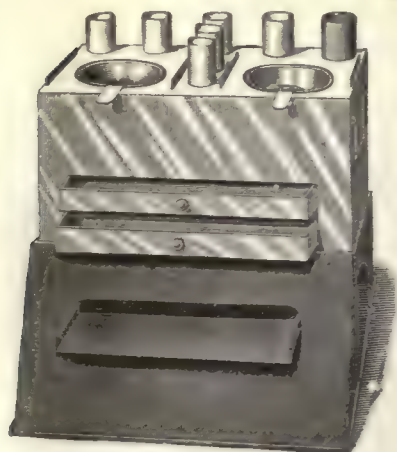


No. 10108.

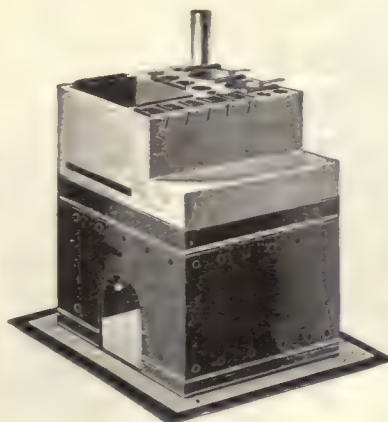
10084. **PAPER THICKNESS GAGE**, standard, for use with any paper from tissue to heaviest card-board. Reads thickness direct upon dial in thousandths of an inch, up to 0.3 inch, without danger of error..... \$35.00
10086. **PAPER THICKNESS GAGE**, pocket type, in leather covered case which fits the pocket. Reads to 0.3 inch in thousandths..... 17.50
- For other **PAPER TESTERS**, see **Testing Machines**.

PARAFFINE BATHS AND OVENS

10100. **PARAFFINE BATH**, simple form, made of polished copper, 7 inches long, $3\frac{3}{4}$ inches wide, and $3\frac{1}{2}$ inches deep, with extra sheet iron bottom and iron base 5 inches high. It is provided with a space for heating slides, and two nickel-plated cups. The shallow cup is $2\frac{1}{8}$ inches in diameter and $\frac{3}{4}$ inch deep, watch glass shape, and the deep one is $2\frac{1}{8}$ inches in diameter and $1\frac{1}{2}$ inches deep. With tubulations for thermometer, gas regulator and for three test tubes. Without burner, thermometer, or regulator 10.00
10102. **PARAFFINE BATH**, round form, of polished copper, $12\frac{1}{2}$ inches in diameter, $3\frac{1}{2}$ inches deep, with sheet iron base, $7\frac{1}{2}$ inches high. There are ten cups, seven of deep form, $2\frac{1}{8}$ inches in diameter and $1\frac{1}{2}$ inches deep, and three shallow, $2\frac{1}{8}$ inches in diameter and $\frac{3}{4}$ inch deep, watch glass shape. With five tubulations in the top for glass tubes, and tubulations for thermometer and gas regulator. Without burner, thermometer, or regulator..... 23.00
10106. **PARAFFINE BATH**, Coplin, of copper, with four cups, 3 inches in diameter by 4 inches deep, and one larger central reservoir 7 by 3 by 4 inches deep with stop-cock to draw off melted paraffine. With three spaces in front for heating material in glass vessels, etc., valve to draw off the water, a cylindrical shield for the gas flame; and with tubulations for thermometer and gas regulator. Outside dimensions, $12 \times 12 \times 23$ inches high, with iron stand 17 inches high 41.25
10108. **PARAFFINE BATH**, Lewis, designed for use with either gas or alcohol lamp. The temperature of the bath is maintained by a constant convection current, which enters through the tube leading from the heating cylinder into the side of the bath and returns from the bottom of the bath back to the heating cylinder. The temperature is easily regulated by means of the stop-cock in the heating tube. This permits the use of a lower or higher temperature according to the melting point of paraffine used. Made of polished copper, with three deep cups, $1\frac{7}{8}$ inches in diameter by $1\frac{1}{2}$ inches deep, and with two shallow cups, $1\frac{1}{8}$ inches in diameter by $\frac{3}{4}$ inch deep, four test tube or vial receptacles and one opening for thermometer. Without burner, thermometer, or regulator..... 19.80



No. 10114.



No. 10116.

No. 10122.
Size 3P.

10110. **PARAFFINE BATH**, same as No. 10108, but larger size, with five deep and three shallow cups \$24.75

10114. **PARAFFINE BATH**, Miller, of polished copper, 8 inches long, 4 inches wide and 4 inches deep, provided with an extra sheet iron bottom to prevent burning out, and an iron base 5 inches high. The bath has two nickel-plated cups, one shallow and one deep. The shallow cup is $2\frac{1}{8}$ inches in diameter and $\frac{3}{4}$ inch deep, watch glass shape, and the deep one is $2\frac{1}{8}$ inches in diameter and $1\frac{1}{2}$ inches deep. Complete with two drawers to hold slides, and with tubulations for thermometer, gas regulator and for five test tubes, but without burner, thermometer or regulator..... 16.50

10116. **PARAFFINE BATH**, Naples, of polished copper, 12 inches long, 9 inches wide and 5 inches high, with sheet iron base 13 inches high. The bath is provided with two nickel-plated cups, one of them $2\frac{1}{8}$ inches in diameter by $1\frac{1}{2}$ inches deep, and the other $2\frac{1}{8}$ inches in diameter by $\frac{3}{4}$ inch deep, watch glass shape; also with five embedding pans with supports to prevent overturning, and seven tubes for vials, $1\frac{3}{4}$ inches deep, two $\frac{3}{8}$ inch, two $\frac{1}{8}$ inch and three 1 inch in diameter. Provided with tubulations for thermometer and gas regulator. The embedding compartment is 5 by 4 by 3 inches deep; under it is a drying chamber with a drawer. The warming table, 9 by 3 inches, in front of the bath, is very useful for keeping embedding pans warm, etc. Without burner, thermometer, or regulator..... 29.00

PARAFFINE EMBEDDING OVENS, simple form, see **Drying Ovens** Nos. 9884-6.

PARAFFINE EMBEDDING OVENS, DeKhotinsky Electrically Heated and Regulated, see **Incubators** Nos. 7890 to 7900.

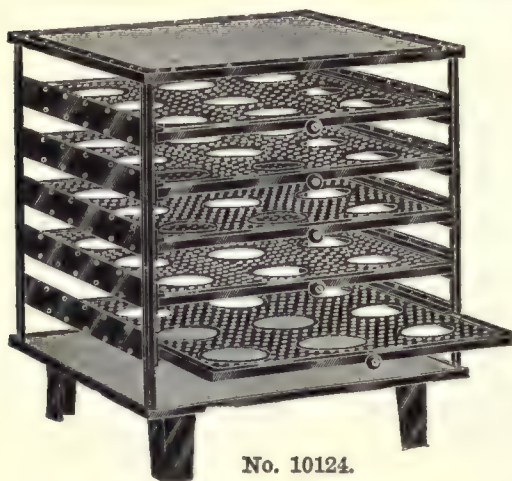
PARAFFINE EMBEDDING OVENS, Wood Frame, Electrically Heated and Regulated, of same construction as No. 7908 Incubators, but with thermostat adjusted and tested at 56°C . before shipment. For full description see No. 7908.

No.	2P	3P	11P	31P	32P	41P
Height inside, inches.....	26	12	15	30	26	30
Width inside, inches.....	18	9	12	20	18	20
Depth inside, inches.....	18	9	$10\frac{1}{2}$	18	18	18
Number of shelves.....	1	1	1	3	1	3
Doors	double	single	double	double	double	double
Height of stand, inches.....	....	....	....	....	32	32
Shipping weight, pounds.....	145	22	38	175	180	220

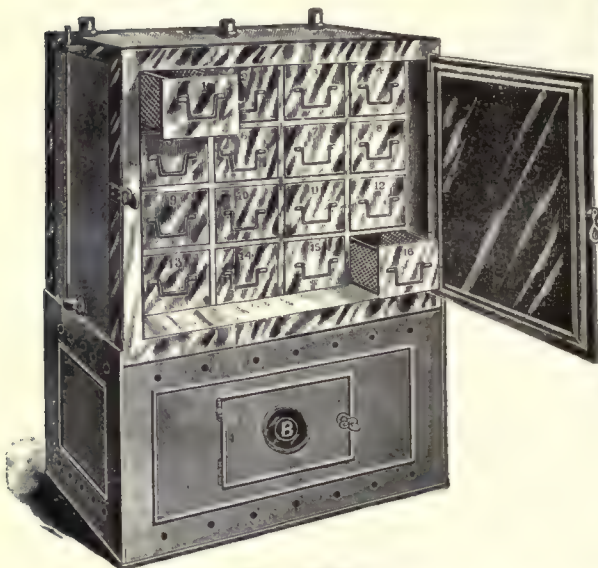
10122. For 110 volts..... 79.00 26.50 48.00 90.00 91.50 102.50

10123. For 220 volts..... 79.00 26.50 48.00 90.00 91.50 102.50

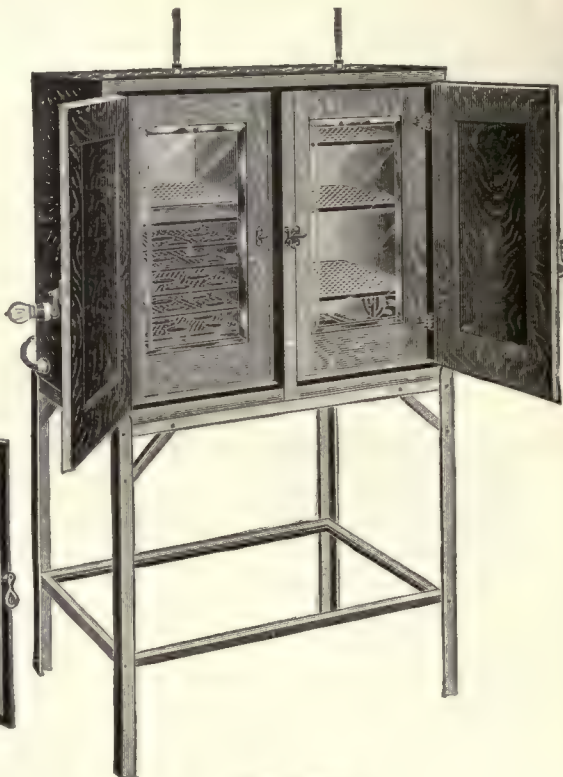
10124. **PARAFFINE RECEPTACLE** for use in Nos. 10122 and 10123, when used as Paraffine Ovens. Constructed of steel with three-inch legs of same material. Top and bottom are of $\frac{3}{16}$ inch transite; the 5 shelves are of perforated metal, each shelf having 9 holes $2\frac{5}{16}$ inches in diameter for paraffine cups. Height, 13 inches; width, 14 inches; depth, 14 inches; shipping weight, 30 pounds. This receptacle can be purchased separately for use in Paraffine Ovens Nos. 2P, 31P, 32P and 41P, or if ordered together, the receptacle will be fitted in place. Complete with 45 paraffine cups. (For illustration, see page 394.)..... 50.00



No. 10124.



Nos. 10130-3.



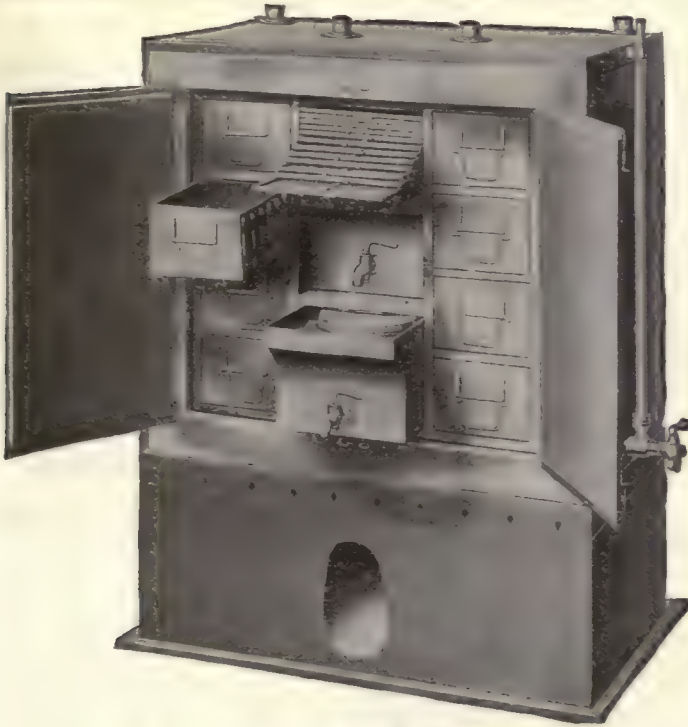
No. 10126.

10126. PARAFFINE EMBEDDING OVEN AND INCUBATOR, Combined, consisting of No. 7908-33

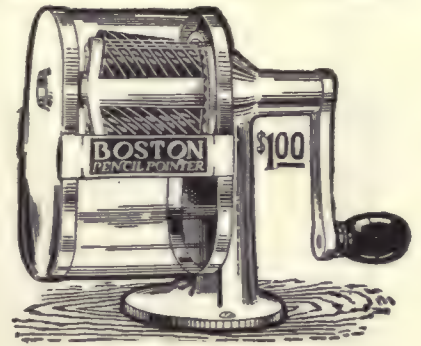
Incubator, with an insulating partition dividing the inner space into two compartments 30 inches high, 17 $\frac{3}{4}$ inches wide, and 18 inches deep. These compartments are thoroughly insulated from each other so that one may be used for incubation at 37.5°C., the other for paraffine work at 56°C. They are provided with independent heaters, pilot lamps, and thermostats, so that either may be used irrespective of the other. The paraffine compartment is supplied with No. 10124 Paraffine Receptacle, affording ample capacity in small space. Complete as described, with paraffine receptacle, 45 paraffine cups to fit same, and thermometer for each compartment, mounted on angle iron stand 32 inches high..... **\$275.00**

PARAFFINE EMBEDDING OVEN, Lillie, of polished copper, with three walls, covered on the outside with an insulating material. Provided with numbered drawers, 10 inches long, 4 inches wide and 3 $\frac{1}{4}$ inches deep, with sides and back of perforated zinc to allow circulation of heat from the top to the bottom of the chamber. The fronts of the drawers are of copper, with drop handles. With water gage, stop-cock and tubulations for thermometer and thermo-regulator, with enclosed sheet iron base 10 $\frac{1}{2}$ inches high, without thermometer or regulator.

No.	A	B	C
Numbers of drawers.....	8	16	24
Dimensions outside, inches.....	13 $\frac{1}{2}$ x19 $\frac{1}{2}$ x14	22 $\frac{1}{2}$ x19 $\frac{1}{2}$ x14	26x28x15
10130. Without heater.....	94.00	133.75	170.00
10131. With gas heater.....	102.25	144.50	181.00
10132. With oil heater.....	175.00	204.60	241.00
10133. With electric heater.....	173.25	222.75	255.00



Nos. 10136-9.



No. 10164.



No. 10170.



No. 10174.

PARAFFINE EMBEDDING OVEN, Lillie's Improved, similar in construction to No. 10130. but provided with 8 drawers and 2 receptacles with screw tops and stop-cocks to enable the contents to be run into molds as required; with 12 perforated trays for drying and fixing purposes. Outside dimensions, 23 inches wide, 25 inches high, and 15½ inches deep, with enclosed sheet iron base 15 inches high.

10136.	Without heater.....	\$198.50
10137.	With gas heater.....	209.20
10138.	With oil heater.....	262.50
10139.	With electric heater.....	288.75

PARAFFINE EMBEDDING BOX, see No. 8934.

PARAFFINE EMBEDDING TABLE, see No. 8936.

PARR CALORIMETER, see Calorimeters.

PASTILLE PRESS, see No. 2400.

10156.	PENCIL , Litmus, made like an ordinary lead pencil, one end blue, the other end red.....	.25
10160.	PENCILS , Wax, for writing on glass, porcelain, etc.	

No.	A	B	C
Color	blue	red	yellow
Each	.15	.15	.15

10162.	PENCILS , Wax Crayons, for marking on glass, porcelain, alundum, etc. Need no sharpening and the marks do not run when heated. The blue burns to an indelible mark on porcelain.	
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No.	A	B	C
Color	black	blue	red
Each	.06	.06	.06
Per dozen	.60	.60	.60

10164.	PENCIL SHARPENER , Boston. Simple and durable; for standard size pencils. Celluloid box holds dust and shavings. New cutters readily inserted.....	1.00
--------	---	------

10170. PERCOLATORS, conical, heavy glass.					
Capacity, pints.....				1	2
Each .....				.60	.70
Capacity, gallons.....			½	1	2
Each			1.00	1.30	2.50
10174. PERCOLATORS, Oldberg's, heavy glass, narrow form, almost cylindrical.					
Capacity, pints.....	½	1	1½	2	2½
Each .....	.60	.70	.85	1.05	1.20
Capacity, gallons.....			½	1	2
Each			1.45	2.35	4.50

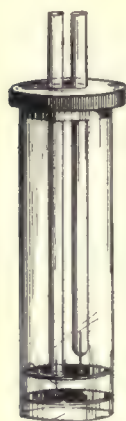
PERCOLATOR BOTTLES or Jars, see Jars, Percolating.

PETRI DISHES, see Culture Dishes.

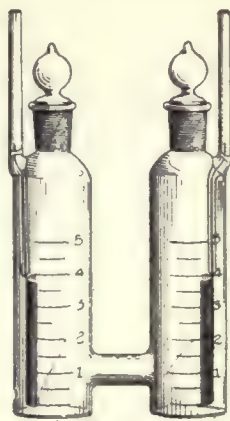
PHOSPHORUS TUBE, Goetz's, see Centrifuges and Accessories.

PHOTOMETERS, see Gas Analysis Apparatus.

PHOTOMETERS, Parr's Sulphur, see No. 2378.



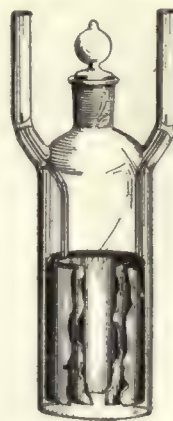
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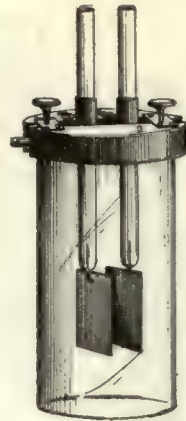
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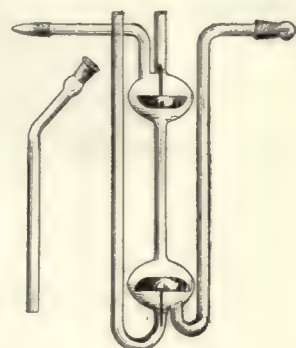
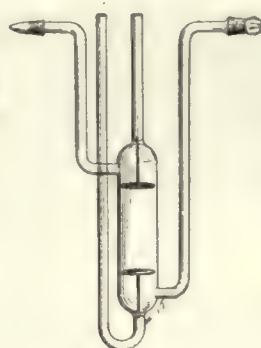
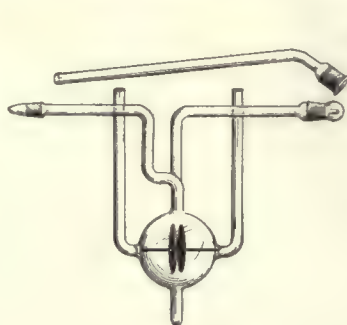
No. 10226.



No. 10230.



No. 10234.



Types of Washburn Conductivity Cells.

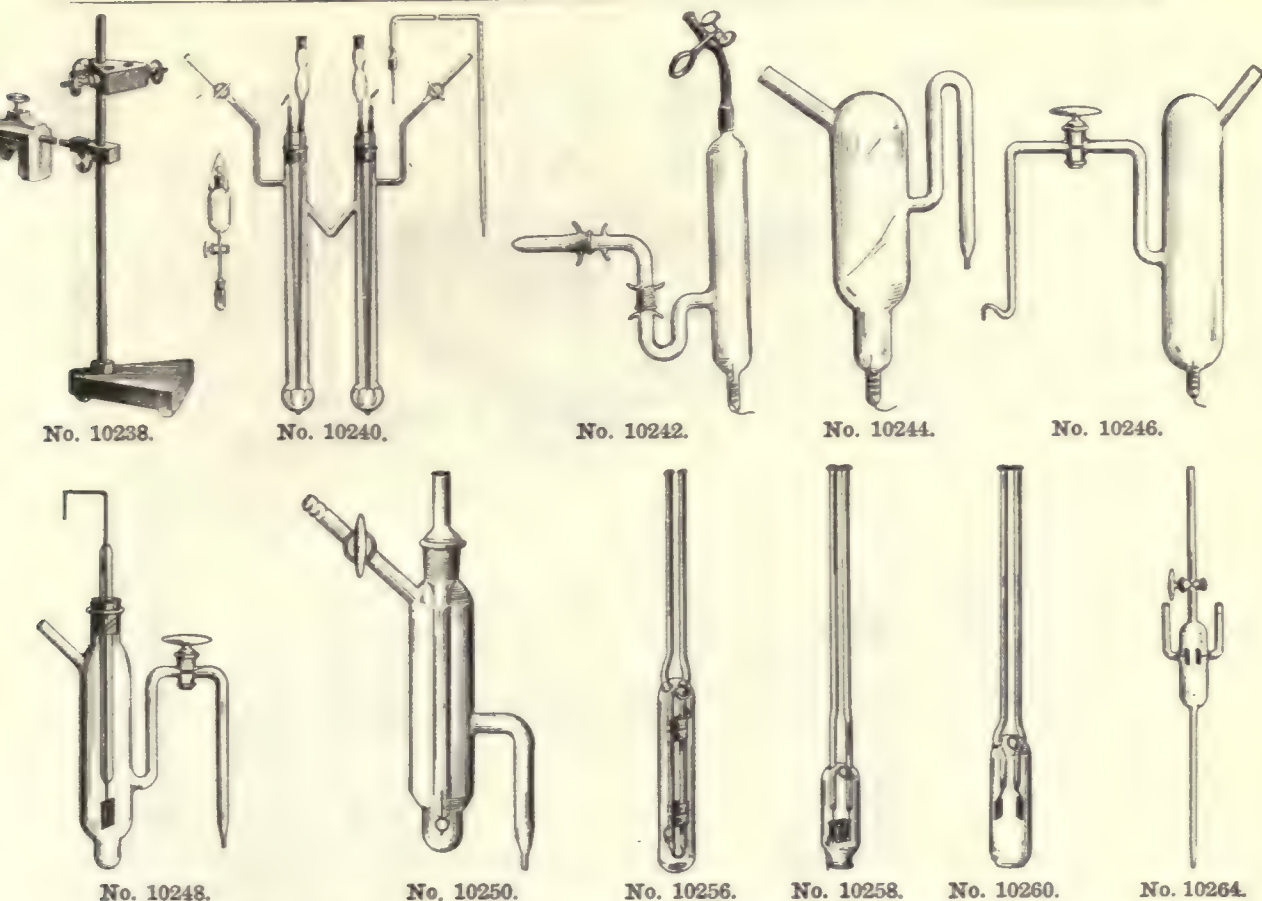
PHYSICAL CHEMISTRY APPARATUS

BATTERY CELLS, all kinds, see general heading **Batteries**.

BRIDGE, Conductivity, see No. 10436.

CALORIMETERS, see general heading **Calorimeters**.

10210. **CELL**, Conductivity, Arrhenius, for poorly conducting liquids, with electrodes of platinum 24 mm in diameter, held 10 mm apart. Weight of platinum, about 5.6 grams. With hard rubber cap \$37.50
10211. **GLASS CELL** only of No. 10210..... 1.50
10214. **CELL**, Conductivity, Kohlrausch, for good conductors, consisting of two cylinders graduated in $\frac{1}{2}$ cm divisions joined together, with large fused-in platinum electrodes and ground glass stoppers. Weight of platinum, about 4.2 grams 29.00
10218. **CELL**, Conductivity, Kohlrausch, for good conductors, with the two arms graduated in 45 parts divided into $\frac{1}{5}$ ths, and fitted with platinum electrodes set in silver rods with conducting plates. Electrodes are adjustable vertically through hard rubber stoppers. Weight of platinum, about 0.75 grams 25.00
10219. **GLASS CELL** only of No. 10218, graduated..... 6.00
10226. **CELL**, Conductivity, Kohlrausch, for poorly conducting liquids, with large, securely fused-in platinum electrodes. Weight of platinum, about 4.2 grams. With ground glass stopper and glass cell graduated in $\frac{1}{2}$ cm divisions..... 25.00
10230. **CELL**, Conductivity, Kohlrausch-Holburn, for poorly conducting liquids, with vertical electrodes supported in adjustable rubber cap so that the distance apart may be changed as desired. Weight of platinum, about 4.2 grams..... 37.50
10231. **GLASS CELL** only of No. 10230..... 1.50
10234. **CELL**, Conductivity, Ostwald, for poorly conducting liquids, with platinum electrodes 15 mm in diameter, held 20 mm apart. Weight of platinum, about 2.2 grams. With hard rubber cap 30.00
10235. **GLASS CELL** only of No. 10234..... 1.50
- CELLS**, Conductivity, Washburn. These cells are described in detail in the Journal of the American Chemical Society, Vol. XXXVIII, for 1916, page 2449. We shall be glad to quote prices upon any of the types described, and to furnish them upon order. They are not carried regularly in stock.
- CELL**, Standard or Normal, see **Batteries**.



10238. **SUPPORT for Conductivity Cells**, consisting of heavy non-corrosive metal base and rod, with clamp for holding cells, hard rubber terminal with mercury wells and binding posts and with clamp for attachment to thermostat.

No.	A	B	C	D	E	F
For Cell No.	10210	10214	10218	10226	10230	10234
Each	\$7.50	7.50	7.50	7.50	7.50	7.50

10240. **COULOMETER**, Washburn's Iodine, as used at the United States Bureau of Standards for determining the value of a Faraday. Complete as illustrated with anode of platinum-iridium, cathode of platinum, bulb tubes, and ground-in siphon tube. **Price dependent upon market price of platinum.** (See Journal of American Chemical Society, Vol. XXXVI, No. 5, for May, 1914, page 916.)

10242. **ELECTRODE**, Calomel Normal, Bloom, designed specially for measurements in Physiological Chemistry. With fused-in platinum electrode, ground on tube and cap. 4.50

10244. **ELECTRODE**, Calomel Normal, Drucker, with fused-in platinum electrode and side tube, without stop-cock on siphon tube. 1.50

10246. **ELECTRODE**, Calomel Normal, Hildebrand, with glass stop-cock on siphon tube and fused-in platinum electrode. (See Journal of American Chemical Society, Vol. XXXV, No. 7, for July 1913, page 851). 3.75

10248. **ELECTRODE**, Calomel Normal, Ostwald, with removable platinum electrode and glass stop-cock on siphon tube. 7.50

10250. **ELECTRODE**, Calomel Normal, Pauli, for liquids of high resistance, with removable platinum electrode, and short siphon tube. 5.00

10256. **ELECTRODE**, Dipping, for good conductors, for immersion in liquids to be tested; in protecting cylinder, with platinum electrodes. Weight of platinum, about 1.3 grams. 15.00

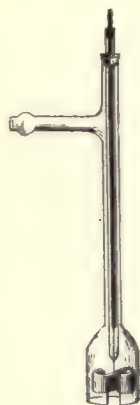
10258. **ELECTRODE**, Dipping, for poor conductors, with parallel platinum electrodes. Weight of platinum, about 1.2 grams. 15.00

10260. **ELECTRODE**, Dipping, for poor conductors, similar to No. 10258, but of larger capacity. Weight of platinum, about 0.6 gram. 12.50

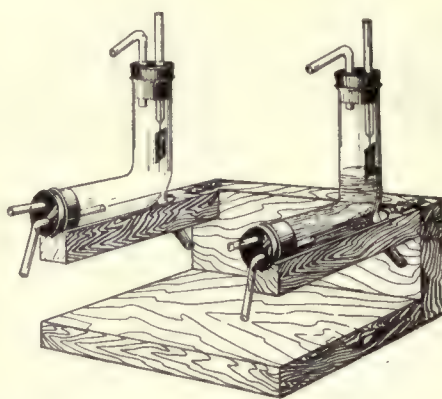
10264. **ELECTRODE**, Pipette, for poor conductors, for measuring solutions affected by the air and for measuring solutions at 100° C. With glass stop-cock. Weight of platinum, about 1.6 grams. 15.00



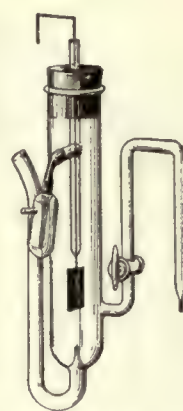
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No. 10272.



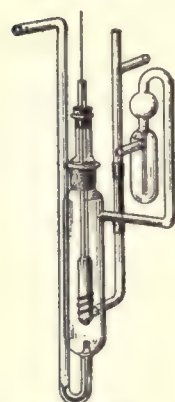
No. 10274.



Nos. 10278-9.



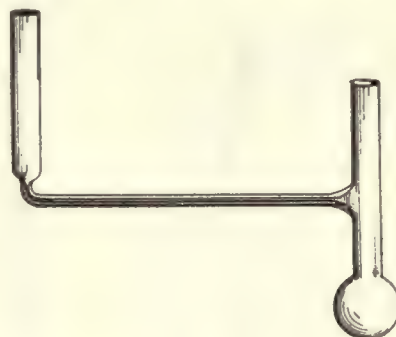
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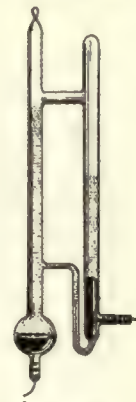
Nos. 10282-3.



No. 10286.

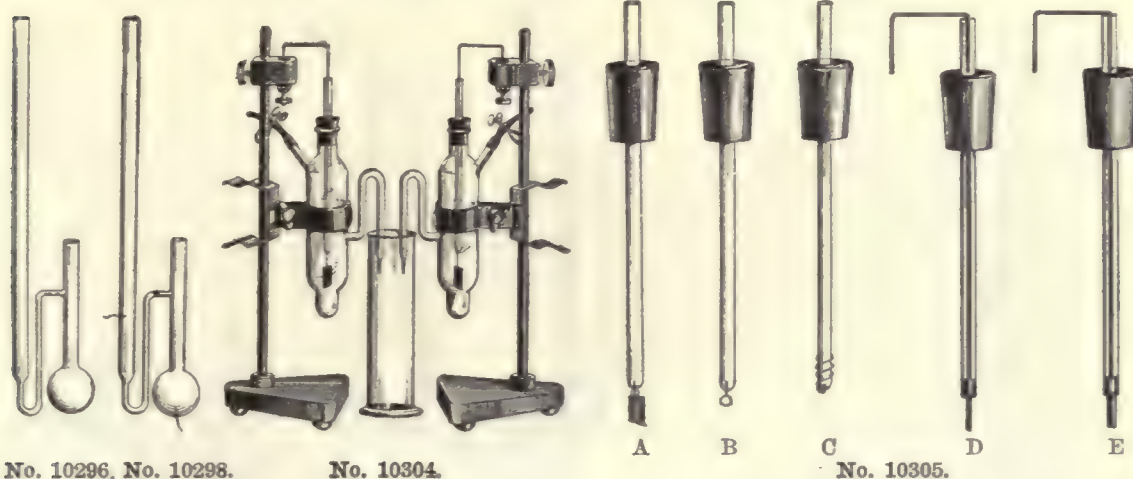


No. 10292.



No. 10294.

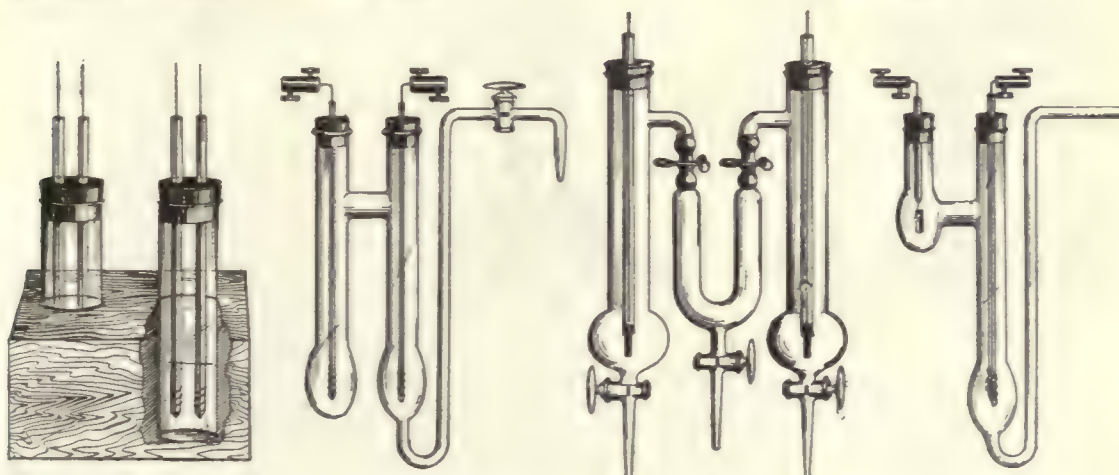
10270. **ELECTRODE, Gas, Hasselbalch**, for use in Hydrogen Ion determinations. With ground in stopper carrying binding post and platinum electrode, two side tubes with glass stop-cocks, and siphon tube with glass stop-cock. \$15.00
10272. **ELECTRODE, Gas, Hildebrand**, with S-shaped platinum electrode so situated that half its surface is immersed, the other half exposed to the gas. With side tube for introduction of gas. (See Journal of American Chemical Society, Vol. XXXV, No. 7, for July 1913, page 850).... 7.50
10274. **ELECTRODES, Gas, Long**, simple form for use in determining the Hydrogen Ion Concentration in urine, blood, etc. Complete with two glass cells with rubber stoppers and platinum electrodes, mounted on wooden stand as illustrated, without clamps or rubber tubing..... 8.00
10278. **ELECTRODE, Gas, Ostwald**, with gas introduction tube, siphon tube with glass stop-cock, and gas exit tube with trap to prevent entrance of air, but without platinum electrode.... 4.00
10279. **ELECTRODE** for No. 10278, with platinum foil attached to glass tube inserted in rubber stopper. Weight of platinum, about 1.2 grams..... 7.50
10280. **ELECTRODE** for No. 10278 with platinum deposited on glass tube inserted in rubber stopper, and with internal contact, according to Luther..... 2.50
10282. **ELECTRODE, Gas, Ostwald-Luther**, similar to No. 10278, but with longer gas introduction tube, siphon adjustable in height, and with ground in tubulation to take electrode, but without electrode 5.00
10283. **ELECTRODE** for No. 10282, with platinum deposited on glass tube and with rubber stopper to fit tubulation 2.50
10286. **SUPPORT for Calomel and Gas Electrodes**, consisting of a heavy non-corrosive metal base and rod with clamp to hold glass cells..... 2.75
- HYDROGEN ION DETERMINATION APPARATUS.** For the determination of the Hydrogen Ion Concentration by means of Gas Electrodes Nos. 10270 to 10283, we recommend the use of our No. 10436 Conductivity Bridge together with a Calomel Electrode (No. 10242 to 10250), one of our Resistance Boxes (see Nos. F4701 to F4722), our No. F4465 Portable Galvanometer, and an appropriate source of current. A Capillary Electrometer (Nos. 10292 to 10298) can be used if desired instead of a Galvanometer.
10292. **ELECTRODE TUBE, Capillary, Lippmann**, horizontal form, without electrodes..... .60
10294. **ELECTRODE TUBE, Capillary, Luther**, filled, exhausted and permanently sealed, with platinum contacts sealed in..... 3.00



No. 10296, No. 10298.

No. 10304.

No. 10305.



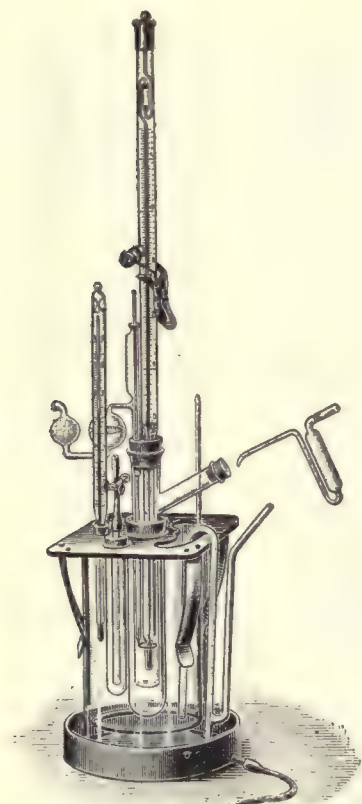
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No. 10324.

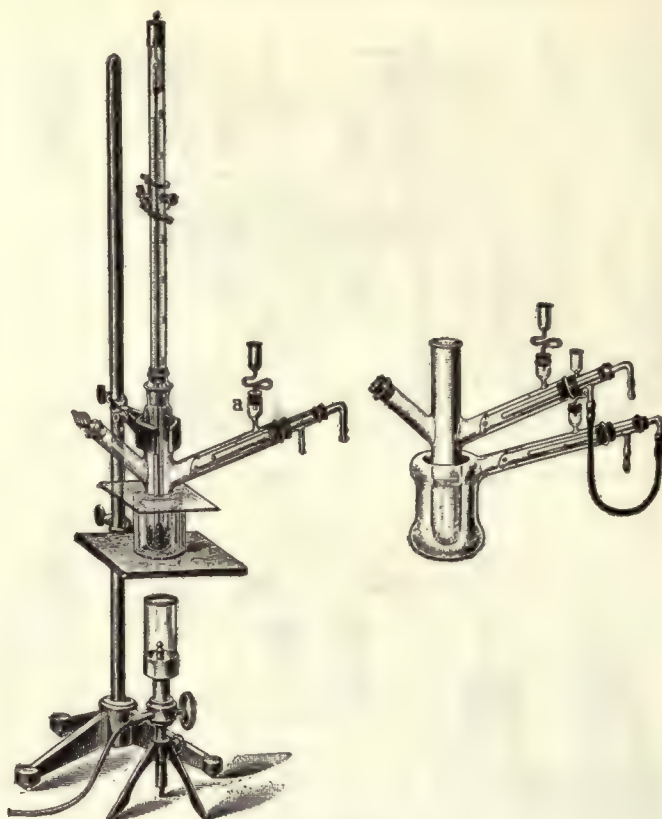
No. 10326.

No. 10328.

10296.	ELECTRODE TUBE, Capillary, Ostwald, without electrodes					\$1.25
10298.	ELECTRODE TUBE, Capillary, Ostwald, with platinum wire sealed in					1.50
10304.	HALF ELEMENTS , consisting of two glass vessels on supports with heavy non-corrosive bases, with adjustable clamps and hard rubber terminals with binding posts. Complete with rubber tubing, glass cylinder, pinch clamps and five different styles of electrodes as illustrated					18.00
10305.	ELECTRODES only of No. 10304, mounted in glass tubes, inserted in rubber stoppers.					
	No.	A	B	C	D	E
	Style	platinum foil	platinum ring	silver spiral	zinc rod	copper rod
	Each	2.00	1.00	1.50	.80	.80
10306.	GLASS CELL only of No. 10304.					1.25
10307.	GLASS CYLINDER only of No. 10304, for connecting the two elements. ....					.60
F4404.	INDUCTION COIL , simple form, after Walker, in sound-proof box.					8.00
10318.	IONIZATION CELL, Smith and Hale , with electrodes consisting of glass tubes with fused-in platinum wire, welded to copper wire for connection. Complete as illustrated with two cells with rubber stoppers, mounted in paraffined hardwood block.					4.50
10324.	MIGRATION TUBE , with silver and copper electrodes sealed in glass tubes, inserted in rubber stoppers. With glass stop-cock.					6.00
10326.	MIGRATION TUBE, Findlay , with silver electrodes cemented in glass tubes inserted in rubber stoppers, with detachable U tube and three glass stop-cocks for withdrawing liquid for analysis. (See Findlay's Practical Physical Chemistry, page 211)					15.00
10328.	MIGRATION TUBE, Loeb and Nernst , for silver salts, with cathode of silver foil and anode of silver wire in a flat spiral, in glass tubes inserted in rubber stoppers.					4.50
10330.	MIGRATION TUBE, Loeb and Nernst , same as No. 10328, but with stop-cock at bottom for withdrawing solution for analysis. (See Findlay's Practical Physical Chemistry, page 207)					6.00



No. 10340.

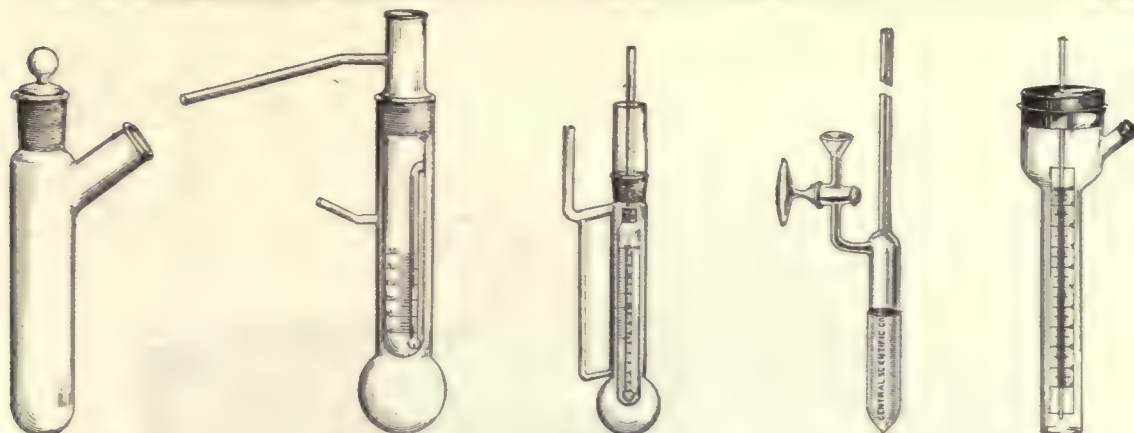


Nos. 10364-7.

10340. **MOLECULAR WEIGHT DETERMINATION APPARATUS, Beckmann's, by the Freezing Point Method.** Consists of a glass cooling jar with nickeled cover and stirrer, 4 air jackets, 4 freezing tubes with corks, 3 filling pipettes, 1 inoculating rod, 1 rubber stopper, zinc trough with glass siphon for drawing off the cooling solution, and sulphuric acid drying tube for use with hygroscopic solutions, but without thermometers \$18.00

Parts and Accessories for No. 10340.

- | | |
|---|-------|
| 10341. AIR JACKET. | .75 |
| 10342. COOLING VESSEL with nickeled cover and stirrer | 3.25 |
| 10343. FILLING PIPETTE | 1.00 |
| 10344. FREEZING TUBE, with corks..... | 1.00 |
| 10345. FREEZING TUBE, with ground in stopper and ground in tubulation for thermometer.... | 2.00 |
| 10346. INOCULATING ROD | .80 |
| 10347. STIRRER of glass with platinum ring containing about 2.1 grams platinum. Price dependent on market price of platinum. | |
| 10348. SULPHURIC ACID DRYING TUBE..... | 1.00 |
| 13452. THERMOMETER for cooling mixture, graduated from -20° to 40° C., in 1 degree divisions | 2.00 |
| 13518. THERMOMETER, Beckmann Differential, with auxiliary scale, graduated in 1/100 degree divisions | 20.00 |
| 10350. ZINC TROUGH, with siphon..... | 2.80 |
| 10351. SIPHON only of No. 10350..... | 1.00 |
| 10364. MOLECULAR WEIGHT DETERMINATION APPARATUS, Beckmann, by the Boiling Point Method. Consists of an iron support with clamp and ring; boiling cylinder with drying tube, ground stopper and tubulature, and with inner condenser; one pair glass jackets with mica cover plate and asbestos pad; rubber stoppers; but without burner or thermometers... | 18.00 |
| 10365. BOILING POINT TUBE for No. 10364, with ground in stopper and tubulature..... | 8.00 |
| 10366. MICRO-BURNER for No. 10364, with glass chimney | 1.50 |
| 10367. STEAM JACKET for No. 10364, for use with liquids of high boiling points, with inner condenser | 6.00 |
| THERMOMETER, Beckmann Differential, for No. 10364, see No. 13518. | |



No. 10372.

No. 10376.

No. 10380.

No. F937.

No. 10396.

10372. **BOILING POINT APPARATUS**, Jones, with ground in stopper and side tubulation..... \$4.00

10376. **MOLECULAR WEIGHT DETERMINATION APPARATUS**, McCoy, consisting of a graduated inner vessel and jacket with rubber connection between. (See Journal of American Chemical Society, Vol. XXII, for April 1900)..... 7.00

10380. **MOLECULAR WEIGHT DETERMINATION APPARATUS**, Menzies, for determining molecular weights by measurements of the vapor pressure. The apparatus consists of a graduated inner vessel and outer jacket ground together. It can be used for two purposes: (1) the determination of the molecular weights of dissolved substances by measuring the lowering of vapor pressure of the solution; (2) the determination of molecular weights of easily volatile substances by measuring their vapor pressures. It requires no thermometer or accessory apparatus, and can be supported on any ring stand. A complete determination requires only from 30 to 40 minutes including the time of weighing. Complete as described..... 8.00

F937. **OSMOTIC PRESSURE TUBE**, University of Chicago form, consisting of a glass tube of small bore 5 feet long, with side arm with stop-cock and funnel tube. Complete with membrane for attachment to lower end..... 4.50

F937A. **ANIMAL MEMBRANES** for use with No. F937each .25

POLARIZING APPARATUS, see **Polariscopes**.

PYCNOMETERS, see **Bottles**, **Specific Gravity**.

RESISTANCES AND RHEOSTATS, see general heading **Electrical Instruments**.

10396. **SURFACE TENSION APPARATUS**, simple form, with straight capillary tube of fine bore, glass scale graduated in mm and immersion tube with side arm and rubber stopper. (See Findlay's Practical Physical Chemistry, page 91)..... 2.50

THERMO-REGULATORS, see general heading **Thermo-Regulators**.

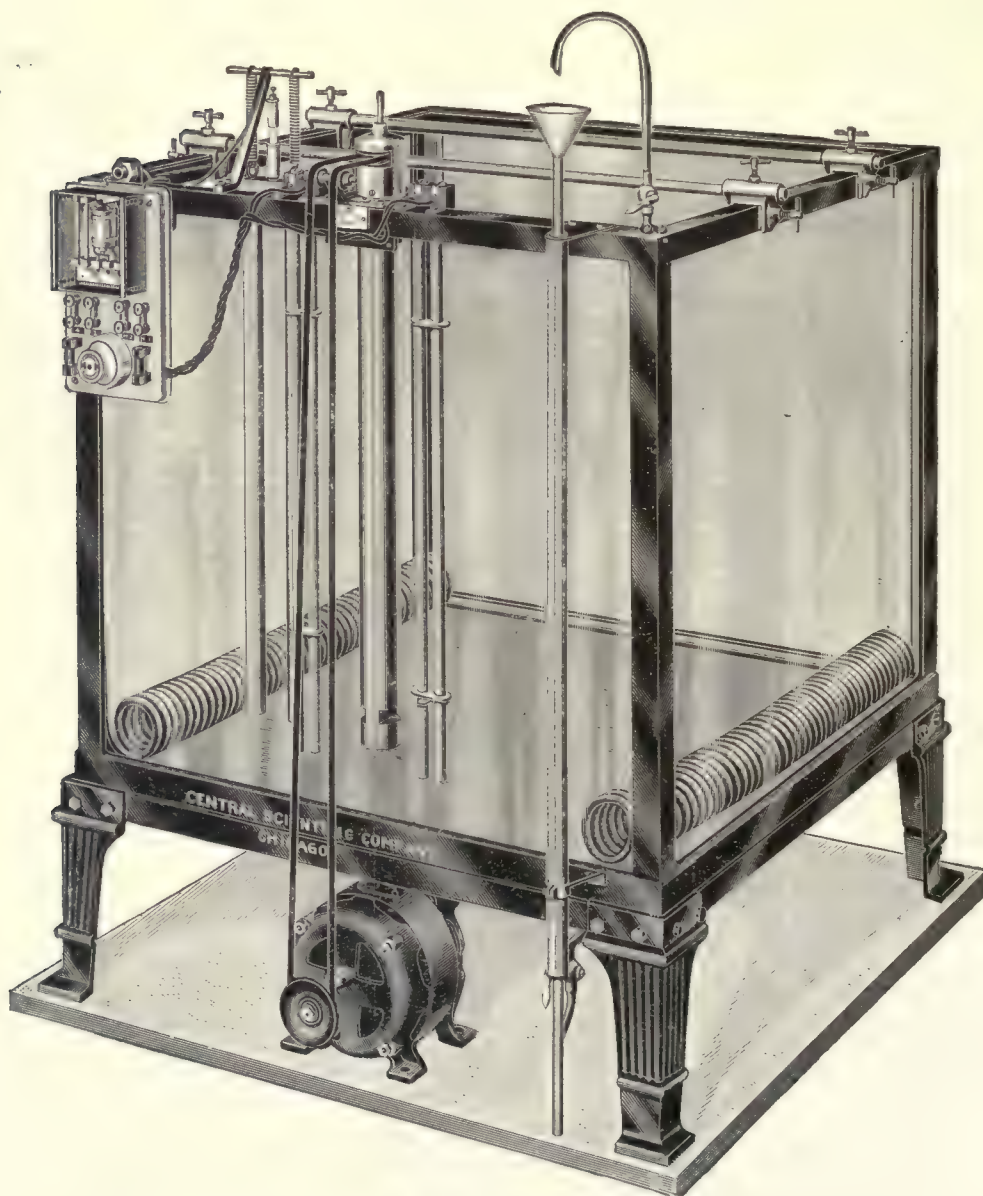
10408. **THERMOSTAT BATH**, Aquarium Type, DeKhotinsky Electrically Heated and Regulated (Patented), with precision mercury thermo-regulator and sensitive iron clad relay.

Construction:—The bath is constructed of heavy plate glass cemented in a frame work of angle iron, with supporting legs of heavy cast iron bolted to the frame. The bottom is also of plate glass set in Portland cement, supported by a plate of reinforced iron. The cement used to hold the glass sides is a special composition which remains plastic, preventing any possibility of leakage due to drying. Extensive experiments conducted at the University of Chicago have shown the lack of necessity for heat insulating material around a bath for use at temperatures from 10° to 60°C. For this reason, we have abandoned the old type of construction and have adopted the aquarium style of bath, because of its superiority in rendering the interior of the bath visible from any position and admitting light to every corner. The bath should be filled with distilled water to avoid the formation of deposits on the glass sides.

Stirring is accomplished by means of a high speed turbine stirrer of nickel-plated brass, which takes water from the bottom of the bath at the rate of 45 liters per minute and delivers it at the top with an expenditure of energy of 45 watts. An extra pulley is provided at the top of the shaft to connect with stirrers in any apparatus placed in the bath.

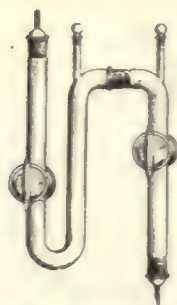
Heating of the bath is effected by means of four electric heating units inserted in seamless brass tubes, fastened together in sets of two and attached by machine screws to the side. These are connected in parallel, two of them being automatically switched on and off by the relay. In order to maintain the temperature through warm weather or at temperatures below that of the room, two **cooling coils** are provided made of nickel-plated brass tubing of 6 mm inside diameter and 20 meters in length, which lie close to the sides and bottom of the bath, entirely out of the way. Through these coils may be passed city water or iced water to maintain the desired temperature.

Temperature control is secured by means of the DeKhotinsky precision thermo-regulator, consisting of two solid drawn steel tubes, covered with brass, and connected to a common head. To this is attached a glass capillary with regulating cap, by which the platinum point may be raised and lowered to change the temperature setting. Coarse regulation may be effected by turning the knurled screw by which the capillary is attached to the regulator head, thus



Nos. 10408-10.

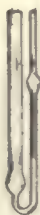
Showing the De Khotinsky Aquarium Type Thermostat Bath, set up complete, ready for operation. This Thermostat is being used in the Physical Chemistry Laboratories of the University of Chicago and other leading universities with entire satisfaction. The illustration shows the large amount of space available for use and the unobstructed illumination from all sides.



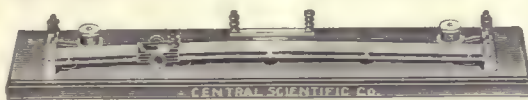
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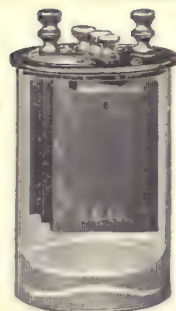
No. 10420.



No. 10422.



No. 10436.



No. F5101.

THERMOSTAT BATH, Aquarium Type, Continued.

raising or lowering the mercury level. The capacity of the steel tubes and the diameter of the capillary are so proportioned as to secure a regulation of $0.005^{\circ}\text{C}.$, or less, which is more sensitive than a Beckmann thermometer. To eliminate vibration of the mercury surface in the capillary chamber and prevent sparking, the thermo-regulator is suspended by two springs. The thermo-regulator is in circuit with our sensitive iron clad relay, of the solenoid type with multiple contacts, the opening and closing of which makes and breaks the current through the regulating units.

The entire design of the bath has resulted from actual laboratory experience throughout many years with baths of various makes, and we have no hesitation in stating that it is superior in design and in effectiveness to any other type. The small space taken up by the heaters, regulator, stirrer and cooling coils, together with the absence of any grating or partition, leaves the entire inside space available for use. Complete as described with four heating units, thermo-regulator, relay, turbine stirrer with motor for operation, constant water level device and drain, two nickel-plated brass support rods with two clamps each, and five feet of cord and separable attachment plug.

Length, 61 cm.

Width, 61 cm.

Depth, 61 cm.

Height from floor, 80 cm.

Capacity, 225 liters.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	\$277.50	280.00	275.00	277.50

10410. **THERMOSTAT BATH, Aquarium Type, DeKhotinsky Electrically Heated and Regulated, same as No. 10408, but larger, with same equipment.**

Length, 71 cm.

Width, 70 cm.

Depth, 61 cm.

Height from floor, 80 cm.

Capacity, 300 liters.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	302.50	305.00	300.00	302.50

10411. **ROD CLAMPS** for use with Nos. 10408 and 10410.....each 1.25
For other **THERMOSTATS**, see **Water Baths**.

10418. **TRANSFERENCE TUBE, Washburn**, for the study of hydration of ions, etc. Complete as illustrated with two stop-cocks with bore equal to that of the tube, ground in glass plugs at the ends, ground joint in the middle and sealed on tubes for obtaining samples to be analyzed, with ground in stoppers. Without electrodes. (See Journal of American Chemical Society, Vol. XXXI, for 1909, page 322)..... 18.00

VAPOR DENSITY APPARATUS, see general heading **Vapor Density Apparatus**.

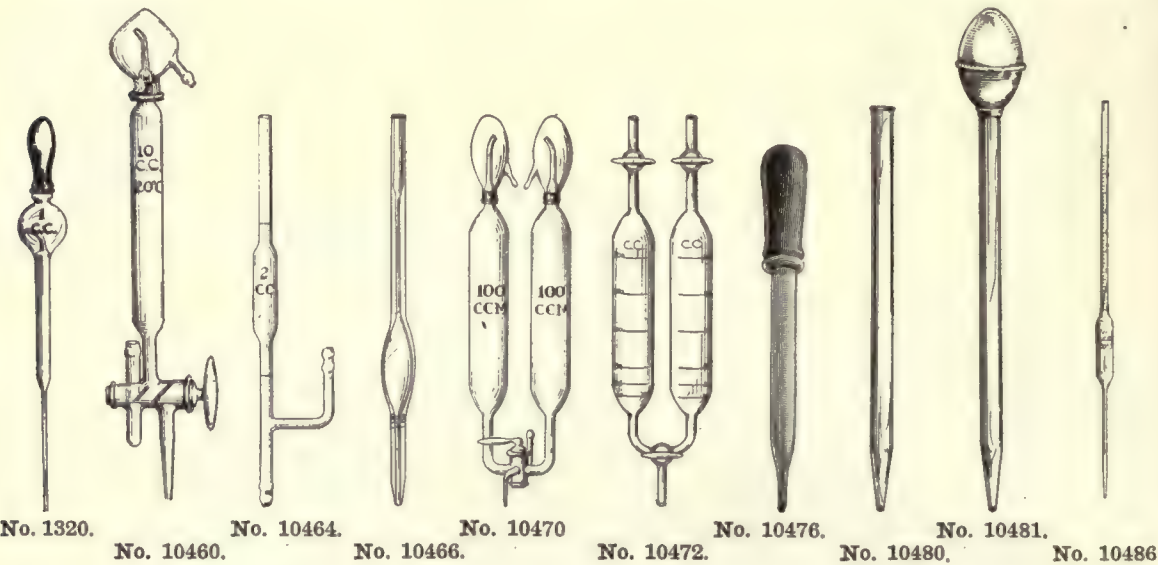
10420. **VISCOSITY PIPETTE, Drucker**, with glass stop-cocks. Time of outflow, 80 to 100 seconds 5.00

10422. **VISCOSITY PIPETTE, Ostwald**, with time of outflow 80 to 100 seconds..... 1.25

F5101. **VOLTAMETER, Copper**, new construction. Consists of a glass jar in which are suspended three copper plates, two loss plates and one gain plate, each of about 40 square centimeters area. These plates are held by an ingenious clamping device and their construction is such that they may be handled without touching with the fingers..... 4.50

F5102. **VOLTAMETER, Silver**, same construction as No. F5101, with detachable silver plates.. 9.00

10436. **WHEATSTONE BRIDGE for Conductivity Measurements, Extended Coil Type**, as developed at the University of Illinois. The bridge is of the usual slide wire form with a half meter scale graduated on the upper half from 475 to 525 cm and on the lower half from 0 to 50 cm in 0.1 cm divisions. A wire of very low thermal coefficient but of high resistance is stretched over the scale, and a sufficient amount is wound on two spools, placed at the ends, to make 1000 cm of total length, exactly divided as to resistance. By means of removable plug contacts, the bridge may be used either as a half-meter or as a ten-meter bridge. In this way the resistance of a solution may be approximately determined on the half-meter scale, the plugs then removed and the exact point determined on the ten-meter scale. By using this bridge, readings can be readily made with an accuracy of 0.01 of 1 per cent. 30.00
For other **WHEATSTONE BRIDGES**, see general heading, **Electrical Instruments**.

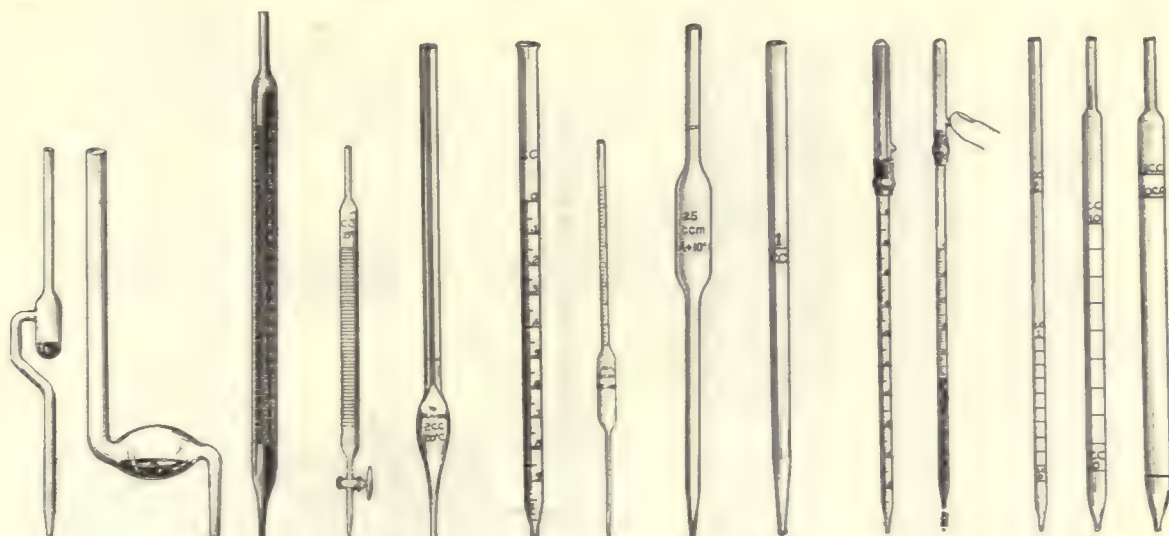


PICKS, Mineralogical, see Hammers.
PILL BOXES, see Boxes.
PINS, Insect, see Insect Pins.

10448.	PINS, ordinary, stiff and sharp pointed, in ½ pound boxes.....	Per box	\$1.00
10454.	PIPES, Clay	Per dozen	.25

PIPETTES

1320.	PIPETTE, Automatic Dropping, with rubber bulb, for delivering exactly 1 cc. Convenient for filling ampoules			1.00
10460.	PIPETTES, Automatic Overflow, with patent three-way stop-cock, and reservoir for collecting the excess.			
	Capacity, cc	10	25	50
	Each	3.50	3.60	3.75
10461.	PIPETTE, Automatic Overflow, same as No. 10460, but with capacity of 17.6 cc for Milk Testing			3.50
10464.	PIPETTE, Calibrating, Ostwald's, capacity 2 cc.....			.80
10466.	PIPETTE, Capillary, for preparing milk smears on microscope slides for counting the bacteria present. Graduated at 1/100 cc. With a 6.4X ocular and a 1.9 mm objective (oil immersion), a 195 mm tube furnishes an apparent field of 1/5000 square cm. (See Bulletins 373 and 378 of the New York Experiment Station).....			1.00
10470.	PIPETTES, Double Automatic, with stop-cock so made that one pipette fills while the other empties.			
	Capacity, cc	25	50	100
	Each	7.00	7.50	8.00
10472.	PIPETTE, Double Automatic, Rothe's, for use in determining iron as perchloride by means of ether. Graduated to 200 cc as illustrated.....			12.00
10476.	PIPETTES, Dropping, Medicine Droppers, with rubber bulb. Length, 4 inches; capacity, about 2 cc.....			Per dozen .30
10477.	PIPETTES, Dropping, same as No. 10476, but with tip curved.....			Per dozen .30
10480.	PIPETTES, Dropping, straight, without bulb.			
	Length, inches		8	12
	Each .....		.10	.15
10481.	PIPETTES, Dropping, same as No. 10480, but with rubber bulb of 25 cc capacity.			
	Length, inches		8	12
	Each .....		.30	.45
	(Other lengths will be made to order.)			
	PIPETTES, Gas, see Gas Analysis Apparatus.			
10486.	PIPETTE, Glucose, Spencer's, capacity 50 cc, graduated from 5° to 20° on the Brix scale in 1/10ths			2.00



No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
10490.	10492.	10496.	10498.	10502.	10506.	10510.	10514.	10516.	10520.	10524.

10490. **PIPETTE, Mercury**, for taking up drops without danger of drawing them into the mouth **\$0.35**

- | | |
|---|-----|
| 10492. PIPETTE, Mercury , for handling small drops of mercury..... | .35 |
|---|-----|

10496. **PIPETTES, Mohr's**, accurately graduated in cc and fractions.

- | No. | A | B | C | D | E | F | G | H | J | K |
|--------------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Capacity, cc. | $\frac{1}{10}$ | 1 | 1 | 2 | 5 | 10 | 20 | 25 | 50 | 100 |
| Graduated to, cc.. | $\frac{1}{100}$ | $\frac{1}{100}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |
| Each | .40 | .45 | .40 | .35 | .40 | .45 | .55 | .60 | 1.00 | 1.10 |

- | | | |
|---|----------------|----------------|
| 10498. PIPETTES, Mohr's , same as No. 10496, but with glass stop-cock. | | |
| Capacity, cc..... | 25 | 50 |
| Graduated to, cc..... | $\frac{1}{10}$ | $\frac{1}{10}$ |
| Each | 1.70 | 1.90 |

10502. **PIPETTES, Ostwald**, as used in the determination of nitrogen, urea and ammonia in urine by the Folin method.
- | | | |
|--------------------|------|------|
| Capacity, cc | 1 | 2 |
| Each | 1.00 | 1.00 |

- | | | | | | |
|---|-----------------|-----------------|----------------|----------------|----------------|
| 10506. PIPETTES, Serological , similar to No. 10496, but graduated to the extreme tip. | | | | | |
| No. | A | B | C | D | E |
| Capacity, cc | $\frac{1}{10}$ | 1 | 1 | 5 | 10 |
| Graduated to, cc..... | $\frac{1}{100}$ | $\frac{1}{100}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |
| Each | .30 | .40 | .30 | .30 | .35 |

10510. **PIPETTE.** Sucrose, capacity 52.096 cc, graduated from 5° to 25° on the Brix scale in $\frac{1}{10}$ ths 2.50
PIPETTE. Viscosity, see Nos. 10420-2.

- | | | | | | | | | | | | | | | |
|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 10514. PIPETTES, Volume or Transfer , with bulb approximately in middle of tube. | | | | | | | | | | | | | | |
| Capacity, cc..... | 1 | 2 | 3 | 5 | 10 | 12 | 15 | 20 | 25 | 30 | 50 | 75 | 100 | 200 |
| Each | .10 | .11 | .12 | .15 | .17 | .20 | .24 | .26 | .28 | .30 | .35 | .45 | .50 | .60 |

- | | | | |
|--|-----|-----|-----|
| 10516. PIPETTES, Volume or Transfer, without bulb, as used in bacteriological work and water analysis. | | | |
| Capacity, cc | 1 | 5 | 10 |
| Each | .10 | .15 | .25 |

10520. **PIPETTE, Wassermann Safety**, for bacteriological and serological work, designed to prevent any danger of infection in handling samples. Sliding the glass cap upward with tubulation closed by the finger fills the pipette. Delivery is controlled by the finger. Graduated from the tip to $\frac{1}{10}$ cc in $\frac{1}{100}$ ths..... .80

10524. **PIPETTES, Water Analysis**, as used in the Hygienic Laboratory of the United States Public Health Service. Set consists of three pipettes; one 11 cc pipette graduated at 0, 10 and 11 cc; one 10 cc pipette graduated from 0 to 10 cc in single cc; and one 2 cc pipette graduated from 0 to 1 cc in $\frac{1}{10}$ ths and with mark at 2 cc.
- | | | | |
|--------------------|-----|-----|-----|
| Capacity, cc | 2 | 10 | 11 |
| Each | .30 | .30 | .35 |

PIPETTES, Weighing, see Bottles, Weighing.



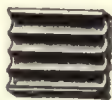
No. 10544.



No. 10548.



No. 10552.



No. 10556.



No. 10560.



No. 10570.



No. 10572.



No. 10574.

PIPETTES, PRECISION OR NORMAL

10530. **PIPETTES, Mohr's, Precision or Normal**, graduated at 20°C., to meet the requirements of the United States Bureau of Standards. With unofficial factory certificate.

No.	A	B	C	D	E	F
Capacity, cc	1	1	5	10	25	50
Graduated to, cc.....	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each	\$1.35	1.20	1.75	1.80	2.50	3.35

10531. **PIPETTES, Mohr's, Precision or Normal**, same as No. 10530 but standardized by the United States Bureau of Standards. With control stamp.

No.	A	B	C	D	E	F
Capacity, cc	1	1	5	10	25	50
Graduated to, cc.....	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each	3.70	3.40	3.80	4.50	5.60	6.00

10536. **PIPETTES, Volumetric, Precision or Normal**, graduated at 20°C., to meet the requirements of the United States Bureau of Standards. With unofficial factory certificate.

Capacity, cc	1	2	5	10	25	50	100
Each .....	.60	.70	.75	.90	1.05	1.20	1.65

10537. **PIPETTES, Volumetric, Precision or Normal**, same as No. 10536, but standardized by the United States Bureau of Standards. With control stamp.

Capacity, cc	1	2	5	10	25	50	100
Each	1.90	1.90	2.00	2.10	2.25	2.60	3.40

10544. **PIPETTE BOTTLE**, with pipette ground into neck and cap ground on. For use with volatile and poisonous liquids.

Capacity, cc	10	25	50	100
Each	2.50	3.00	3.50	4.00

For other **PIPETTES**, see **Blood Testing Apparatus**.

10548. **PIPETTE BOX**, cylindrical, for use in sterilizing pipettes, of sheet copper, with tightly fitting cover with handle. Length, 15 inches; diameter, 2 inches..... 1.80

10549. **PIPETTE BOX**, cylindrical, same as No. 10548, but made of sheet iron..... 1.30

10552. **PIPETTE BOX**, rectangular form, of sheet copper, with overhanging cover with handle. Size, 2x2x12½ inches 3.30

10553. **PIPETTE BOX**, same as No. 10552, but made of sheet iron..... 1.75

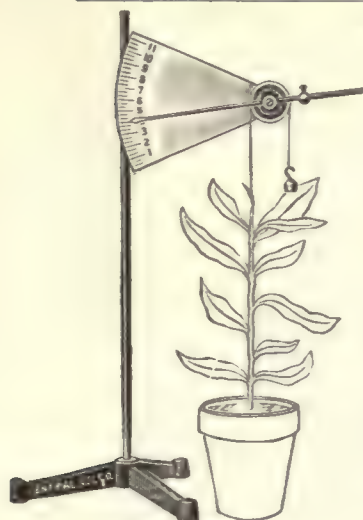
10556. **PIPETTE REST**, of porcelain..... .60

10560. **PIPETTE SUPPORTS**, of hardwood, revolving, for 12 pipettes..... 2.70
PITCHERS, Acid, see **Acid Pitchers**.

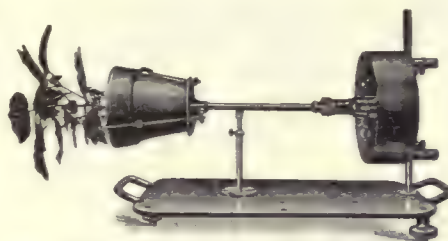
10570. **PLANE, Block**, iron, 5½ inches long, 1¼-inch cutter80

10572. **PLANE, Double End**, iron, 8 inches long, 1¾-inch cutter. This plane may be used as a block plane, or by reversing the cutter and wedge it can be used to plane close up into corners or other difficult places..... 1.80

10574. **PLANE, Jack**, wood bench plane, 2-inch cutter, double iron..... 1.40



No. 10590.



No. 10606 (shown in horizontal position).



No. 10686. No. 10690. No. 10692. No. 10696.



No. 10606 (shown in vertical position).

PLANT PHYSIOLOGY APPARATUS

(This section has been practically eliminated on account of the difficulty in obtaining deliveries. A return to normal conditions will result in a large section being inserted in the catalog covering the requirements for this subject.)

10590. **AUXANOMETER**, a simple and practical apparatus for measuring plant growth. A silk thread attached to the plant passes over a pulley with which it is held in close contact by a weight. This pulley moves freely and the pointer attached to it is provided with a counterbalance. The scale is accurately divided, each division representing a growth of .01 inch, and may be placed at any desired height on the support rod. \$4.50

10606. **CLINOSTAT**, for investigations involving plants of moderate weight where great precision of revolution is not required. It consists essentially of the works of a powerful eight-day clock, geared to a revolution in fifteen minutes and enclosed in a practically dust and moisture-proof case, 16 cm in diameter. A ball-bearing shaft takes the strain from the works, which are started and stopped by a cylindrical nut projecting from the upper surface. It is to be wound, not too tightly, once in two days, which may be accomplished without disturbing the plant. Properly used it will carry a 4-inch or smaller pot horizontally, or a larger size vertically. As with all clinostats, however, it revolves with greater evenness the smaller the weight it has to carry, and consequently the smallest pots allowed by the subject under study should be used. The size with which the instrument works best is the three-inch, this size, however, being larger than commonly supposed, since the measurements of pots are all internal. Complete as described with directions for use. 25.00

PLATE, Arsenic, see Arsenic Plate.

PLATES, Asbestos, see Asbestos Pads.

PLATES, Desiccator, see Desiccators.

10686. PLATES, Glass, circular , for covering beakers, dishes, etc. Edges not ground.					
Diameter, mm.....	60	80	100	120	150
Each .....	.06	.08	.12	.14	.16
10688. PLATES, Glass, circular , same as No. 10686, but ground on one side. Edges not ground.					
Diameter, mm.....	60	80	100	120	150
Each .....	.10	.12	.16	.20	.24
10690. PLATES, Glass, circular , same as No. 10686, but with hole in center for stirring rod. Edges roughly ground. Diameter, mm.....				75	100
Each .....				.20	.25
10692. PLATES, Glass, circular , same as No. 10690, but with hole at side for stirring rod.					
Diameter, mm.....	60	80	100	120	150
Each .....	.15	.20	.25	.30	.40
10696. PLATES, Glass, square , for covering jars, beakers, etc. Edges not ground.					
Length of side, mm.....	50	75	100	150	200
Each .....	.03	.04	.05	.10	.16
Per dozen .....	.25	.40	.50	.95	1.60
10698. PLATES, Glass, square , same as No. 10696, but of double thick glass and ground on one side.					
Edges not ground. No.....	A	B	C	D	E
Length of side, mm.....	50	75	100	150	200
Each .....	.04	.05	.06	.09	.20
Per dozen .....	.40	.50	.60	.90	2.00
10702. PLATES, Glass, heavy plate, square , ground rough on one side, with edges slightly ground. For use with bell jars, etc.					
Length of side, mm...	100	125	150	200	250
Each .....	.30	.40	.50	.70	1.20
10708. PLATES, Glass, blue cobalt , rectangular, for flame tests.					
Size, mm.....	50x50	50x75	75x75	75x100	100x100
Each .....	.10	.12	.15	.20	.25



F7151. **PLATES, Glass, colored, of best pot glass, 10 cm square. Colors as near spectral as possible to produce. Edges not ground.**

No.	A	B	C	D	E	F	G
Color	violet	indigo	blue	green	yellow	orange	red
Each	\$0.15	.15	.15	.15	.15	.15	.15

PLATES, Hot, see Hot Plates.

PLATES, Porcelain Filter, see Filter Disks No. 5366.

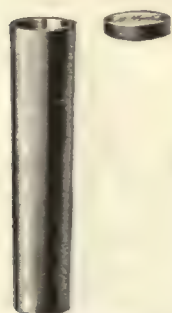
10720. PLATE, Porcelain, for color reactions. Size 90x110 mm, with 12 concavities.	.70
10724. PLATE, Porcelain, glazed, round, 5½ inches in diameter.	.75
10726. PLATE, Porcelain, glazed, square, 5½x5½ inches	.75
PLATE, Porcelain Streak, see Arsenic Plate.	
7316. PLATE, Porous Clay, dinner plates, for quickly drying precipitates and crystals. Diameter, 8 inches	.25

PLATINUM WARE

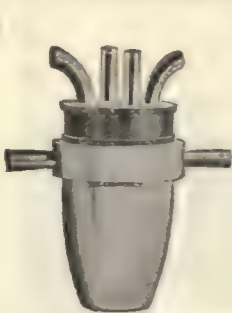
Our platinum ware is warranted pure and of the most approved shapes. Dishes and crucibles are all hammered and thoroughly tested after being finished. We carry in stock only those forms for which there is the greatest demand. All others furnished shortly after receipt of order. Special shapes and designs will be made to order. Platinum ware will be sent only by registered U. S. mail. We advise that scrap platinum sent in for credit or exchange be shipped in the same manner. Old or scrap platinum is bought at the market price. Weights given below are approximate only.

Prices will be governed by the Market Price of Platinum.

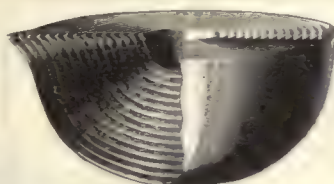
1455.	BLOWPIPE TIP, Platinum, for Plattner's blowpipe.						
10740.	BOATS, Platinum, for combustion. Width, $\frac{1}{2}$ inch; depth, $\frac{3}{8}$ inch; with handles.						
	Length, inches.....	1 $\frac{1}{2}$	2	3	3 $\frac{3}{4}$		
	Approximate weight, grams.....	3	4	6	6.5		
10742.	BOAT, Platinum Filter, and Holder, Blair's, for iron and steel analysis. Length, about 2 inches; width, about $\frac{1}{2}$ inch; depth, about $\frac{5}{16}$ inch. Approximate weight of boat and holder complete, 19 grams.						
10743.	HOLDER for Blair's Platinum Boat No. 10742, of rubber.....				2.50		
10746.	COMBUSTION TUBE, Platinum, Seamless, 12x$\frac{3}{4}$ inch, with prolongation 5x$\frac{1}{4}$ inch; approximate weight, 130 grams. Other sizes to order.						
10750.	CONES, Platinum Filter, seamless, 60°, profusely perforated with holes .016 to .025 inch.						
	Diameter, inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	
	Approximate weight, grams.....	1	2.1	3.1	5.3	9.2	
10752.	CONE of Wood, with wooden mold, for reshaping platinum filter cones to the correct angle					7.00	
10756.	PLATINUM CRUCIBLES, with cover. Crucible and cover weigh approximately as many grams as they hold cubic centimeters. Covers are always furnished unless specified otherwise.						
	Capacity, cc.....	8	10	15	20	25	30
	Diameter and depth, mm.....	22	25	30	33	35	40
	Approximate weight, grams.....	8	10	15	20	25	30
	Prices will be governed by the market price of platinum.						
10760.	CRUCIBLES, Platinum, Gooch's, with perforated bottom, with cover and cap for bottom.						
	Capacity, cc	10	15	20	25	30	
	Diameter and depth, mm.....	27	32	33	36	39	
	Approximate weight, grams.....	13	18	22	29	34	
10762.	CRUCIBLE, Platinum, Gooch's, low form with large filtering surface, as used in bitumen and asphalt analysis. Capacity, 30 cc; approximate weight, 30 grams.						



No. 10764.



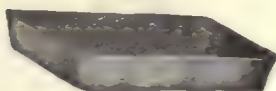
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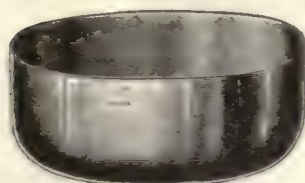
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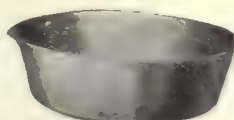
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No. 10782.



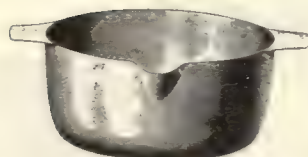
No. 10788.



No. 10790.



No. 10792.



No. 10794.



No. 10798.



No. 10800.

10764. **CRUCIBLE, Platinum, J. Lawrence Smith's**, with cover, for alkali determinations in rocks and minerals. Height, 80 mm; diameter at top, 18 mm; at bottom, 15 mm; capacity, 18 cc; approximate weight with cover, 34 grams. (See Bulletin No. 422, United States Geological Survey, page 172.)

10768. **CRUCIBLE, Platinum, Shimer's Combustion**, for determining carbon in iron and steel.

Capacity, cc	30	60
Approximate weight, grams.....	52	93

(Special booklet will be sent on application.)

10772. **DISHES, Platinum, evaporating, round bottom, with lip.**

Capacity, cc	15	20	25	35	50	75	100	125	150	200	250	300
Diameter, mm	38	42	44	48	56	65	72	78	84	94	98	104
Approximate weight, grams..	5	6	8	12	17	25	33	42	50	67	80	94

10774. **DISHES, Platinum, Blair's**, for iron analysis. Flat bottom, with straight sides and lip, wire rimmed. Capacity, cc

280	380	525
-----	-----	-----

Approximate weight, grams..... 80 100 120

10778. **DISH, Platinum, Classen's**, for electrolytic analysis, with either polished or sand-blasted inner surface. Diameter, 90 mm; depth, 42 mm; capacity, 250 cc; approximate weight, 35 grams. (In ordering kindly specify kind of inner surface desired.)

10780. **DISHES, Platinum, Incinerating**, rectangular shape with flat bottom.

Capacity, cc	15	20
Approximate weight, grams.....	10	14

10782. **DISH, Platinum, Milk Analysis**, capacity, 45 cc; approximate weight, 17 grams.

10784. **DISH, Platinum, Payne's**, for fertilizer analysis, flat bottom with lip, wire rimmed. Capacity, 100 cc; approximate weight, 40 grams.

10788. **DISH, Platinum, Sugar Analysis**, lipped, with flat bottom and straight sides. Capacity, 35 cc; approximate weight, 16 grams.

10790. **DISH, Platinum, Sugar Analysis**, deep form with handle. Capacity, 28 cc; approximate weight, 15 grams.

10792. **DISHES, Platinum, Sugar Analysis**, flat bottom, with or without lip or handle.

Capacity, cc	10	20	25	35
Approximate weight, grams.....	10	14	18	20

(In ordering specify whether lip and handle are desired.)

10794. **DISH, Platinum, Sugar or Milk Analysis**, with two handles and lip. Made only to order. Capacity, 45 cc; approximate weight, 15 grams.

10798. **DISH, Platinum, Water Analysis**, round bottom, shallow form, without lip. Capacity, 100 cc. Approximate weight, 20 grams.

10800. **DISH, Platinum, Water or Iron and Steel Analysis**, shallow form with lip. Capacity, 45 cc; approximate weight, 15 grams.



10806. **ELECTRODES, Platinum Anodes**, for electro-analytical work, made of heavy wire.

No.	A	B	C
Length, mm	150	150	125
Diameter of spiral, mm.....	38	50	15
Approximate weight, grams.....	8-9	20	7

10808. **ELECTRODES, Platinum Cathodes**, for electro-analytical work, made of platinum sheet.

No.	A	B	C
Diameter, mm	57	25	25
Length of electrode, mm.....	75	50	50
Approximate weight, grams.....	20	11	11

10810. **ELECTRODE, Platinum Gauze Cathode, Hollard's**, with special wire frame anode, designed to prevent formation of bubbles. Approximate weight, 37 grams. Diameter of anode, 2 inches.

10812. **ELECTRODES, Platinum Gauze**, cylindrical form, of 52-mesh gauze. Diameter, 25 mm; height of cylinder, 50 mm.

No.	A	B	C
Form	open	closed	rotating
Approximate weight, grams.....	7	6	18

10814. **ELECTRODE, Platinum, Classen's Plate**, with rod. Diameter, 1 inch; length of stem, 4 inches. In ordering, kindly specify thickness of plate desired.

10818. **FOIL, Platinum.**

Style	light	medium	heavy
Thickness, inches .....	.001	.002	.004
Approximate grams per square inch.....	0.353	0.705	1.411

(Other thicknesses from tissue to plates can be supplied upon short notice.)

FORCEPS, with Platinum Tips, see Forceps.

10822. **GAUZE, Platinum.**

Mesh	45	52
Size of wires, B. & S. gage.....	31	38
Approximate grams per square inch.....	1.500	0.543

MUFFLES, Platinum, any size or shape made to order.

10828. **SPATULAS, Platinum.**

No.	A	B
Length, inches.....	2 $\frac{3}{4}$	4
Approximate weight, grams.....	5	8

10830. **SPONGE, Platinum, Wired**, for hydrogen ignition.

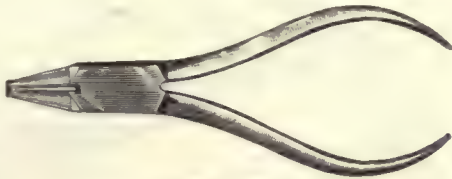
10834. **SPOONS, Platinum**, for deflagration in blowpipe analysis.

No.	A	B	C	D	E
Diameter of bowl, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Depth of bowl, inches.....	$\frac{5}{32}$	$\frac{7}{32}$	$\frac{9}{32}$	$\frac{11}{32}$	$\frac{13}{32}$
Approximate weight, grams.....	0.9	2.0	4.2	4.6	6.5

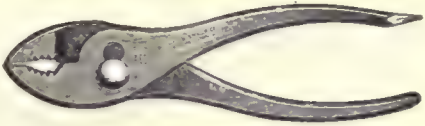
TONGS with Platinum Tips, see Tongs, Crucible.



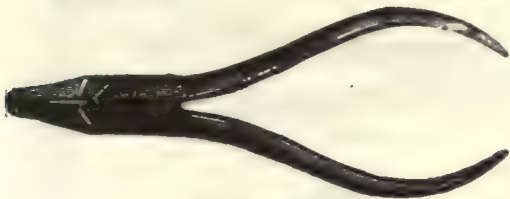
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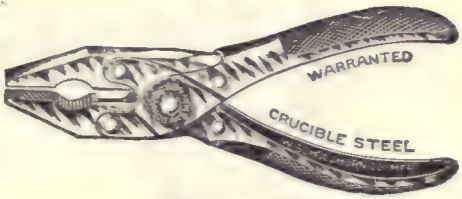
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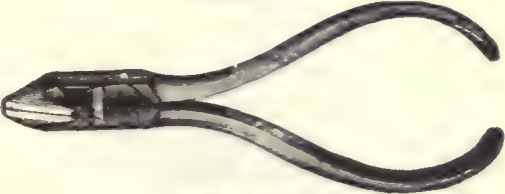
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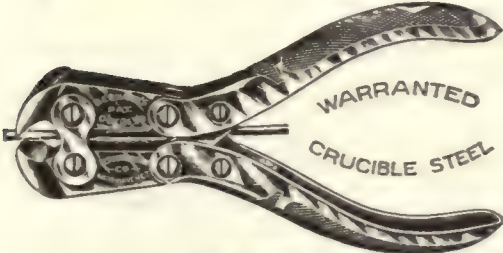
No. 10864.



No. 10866.



No. 10863.



No. 10872.



No. 10870.

10838. TRIANGLES, Platinum, with flat, solid ends.

For crucible, cc.....	10	15	20	30	40
Length of side, inches.....	1 1/4	1 5/8	1 3/4	2 1/4	2 3/4
Size of wire, inches.....	.045	.045	.055	.055	.064
Approximate weight, grams.....	5	8	11	12	15

10842. TRIANGLES, Platinum, for use in Holder No. 13950, made of heavy wire.

For crucible, cc.....	10	15	20	30	40
Size of wire, inches.....	.047	.047	.050	.050	.062
Approximate weight, grams.....	2.0	2.5	4.5	5.0	7.5

TRIANGLE HOLDER for No. 10842, see No. 13950.

WEIGHTS, Platinum, see general heading Balances and Weights.

10846. PLATINUM WIRE.

B. & S. gage....	18	20	22	23	24	25	26	27	28	29	30	32	34	36
Grams per foot..	5.37	3.41	2.08	1.76	1.33	1.08	0.85	0.65	0.56	0.41	0.33	0.21	0.14	0.09

HOLDER for Platinum Wire, see No. 7990.

10856. PLIERS, flat nose.

Length, inches	5	6
Each	\$0.70	.80

10858. PLIERS, round nose.

Length, inches	5	6
Each .....	.25	.40

10862. PLIERS, Combination. Gas plier, wire cutter, wrench and screw driver combined. Drop forged from high grade tool steel and warranted free from defects. Nickel-plated. A very useful tool.

Length, inches	6	10
Each .....	.50	.90

10864. PLIERS, Combination. A flat nose gas plier and wire cutter combined. Open throat, parallel jaws, full nickel-plated. Length, 5 1/2 inches

1.75

10866. PLIERS, Gas, cast steel, fine quality. Length, 9 inches.....

.70

10868. PLIERS, Nippers, Diagonal Cutting, convenient for cutting in places difficult of access.

Length, inches	5	5
Each	1.50	2.00

10870. PLIERS, Nippers, End Cutting, 6-inch.....

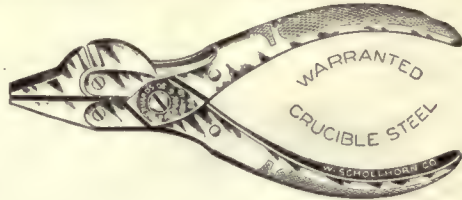
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10872. PLIERS, Nippers, End Cutting, Bernard's, 6-inch, open throat jaws, nickel-plated, interchangeable parts. Its compound system of leverage makes this tool a very powerful cutter..

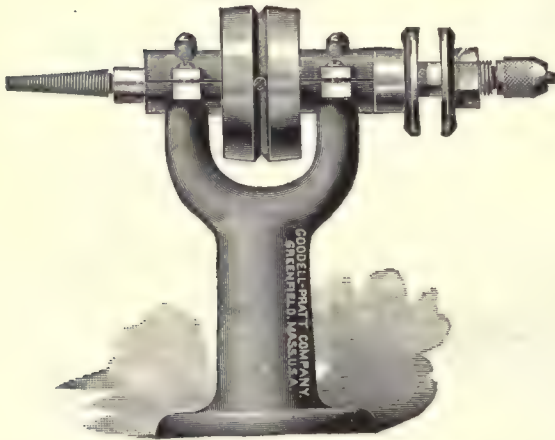
3.00



No. 10874.



No. 10876.



No. 10894.



No. 10878.



No. 10884.



No. 10886.

10874. PLIERS, Wire Cutting. Flat nose, side cutting pliers.		
Length, inches	5	6
Each	\$1.30	1.70
10876. PLIERS, Wire Cutting, Bernard's. Open throat, parallel jaws, nickel-plated.		
Length, inches	4½	5½
Each	1.75	2.25
10878. PLIERS, Wire Cutting, Button's patent.		
Length, inches	4½	6
Each .....	.70	.90
10884. PLUMB BOB, Iron, japanned, weight, 9 ounces .....		.15
10886. PLUMB BOB, Mercury. Made from solid steel rod, bored out and filled with mercury, which makes it unusually heavy in proportion to its size, and the center of gravity low. The small diameter allows it to be used close to corners and walls. The point is hardened and the body and point ground. Nickel-plated and furnished with a braided silk line. Size, 4x½ inches; weight, 2½ ounces.....		1.00

PNEUMATIC TROUGHS, see Troughs, Pneumatic.

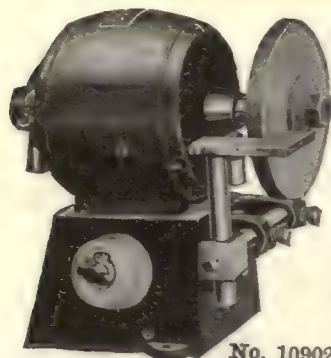
For Polariscope and Accessories, write for special information.

POLICEMEN, see Rubber Policemen.

10892. POLISHING HEAD. Japanned iron frame; steel spindle ¾ of an inch in diameter and 8 inches long; adjustable boxes. Carefully threaded taper screw on one end and three-jawed chuck for 0 to ⅝-inch drills on the other. Fitted to hold emery wheels, circular saws, buffers, etc., which have ¾-inch hole and are not over ¾-inch in thickness. Height, 7 inches. Pulley will take ⅞-inch round or ¾-inch flat belt. Net weight, 2¾ lbs.....		2.50
10894. POLISHING HEAD. Japanned iron frame; steel spindle ½-inch in diameter and 10 inches long; adjustable boxes. Carefully threaded taper screw on one end and three-jawed chuck for 0 to ¼-inch drills on the other. Fitted to hold emery wheels, circular saws, buffers, etc., which have ½-inch hole and are not over ¾-inch in thickness. Height, 7 inches. Pulley will take ⅞-inch round or ¾-inch flat belt. Net weight, 4¼ lbs.....		4.00

ACCESSORIES FOR NOS. 10892-4 POLISHING HEADS.

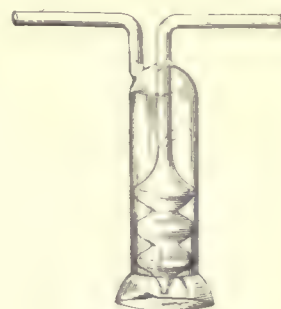
10895. CIRCULAR SAWS, good quality steel, 2½ inches in diameter. No.	A	B
Size hole, inches.....	¾	½
For Polishing Head No.....	10892	10894
Each .....	.40	.55
10896. EMERY WHEELS, fine quality, 3 inches in diameter, ½-inch thick. No.	A	B
Size hole, inches.....	¾	½
For Polishing Head No.....	10892	10894
Each .....	.70	.70
10897. FELT POLISHING WHEEL, fine quality felt, 5 inches in diameter, 1-inch wide, ¼-inch hole.		
Fits screw end of either No. 10892 or No. 10894 Polishing Head.....		4.10
10898. MUSLIN BUFF WHEELS. 35 pieces heavy muslin, strongly attached together; 3 inches in diameter. No.	A	B
Size hole, inches.....	¾	½
For Polishing Head No.....	10892	10894
Each30	.30



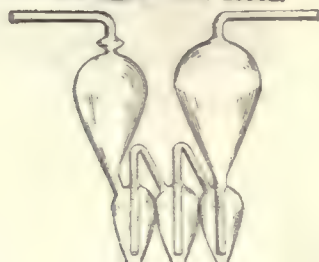
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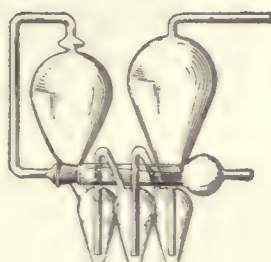
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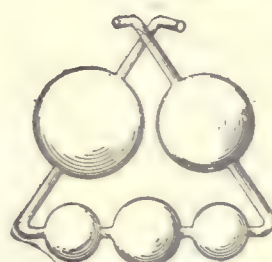
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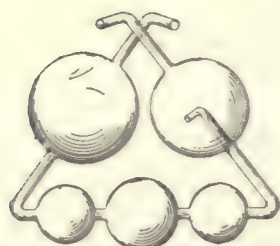
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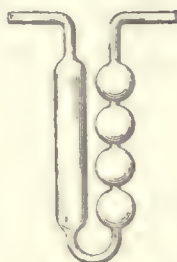
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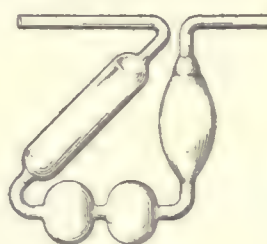
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No. 10924.



No. 10926.



No. 10928.



No. 10932.

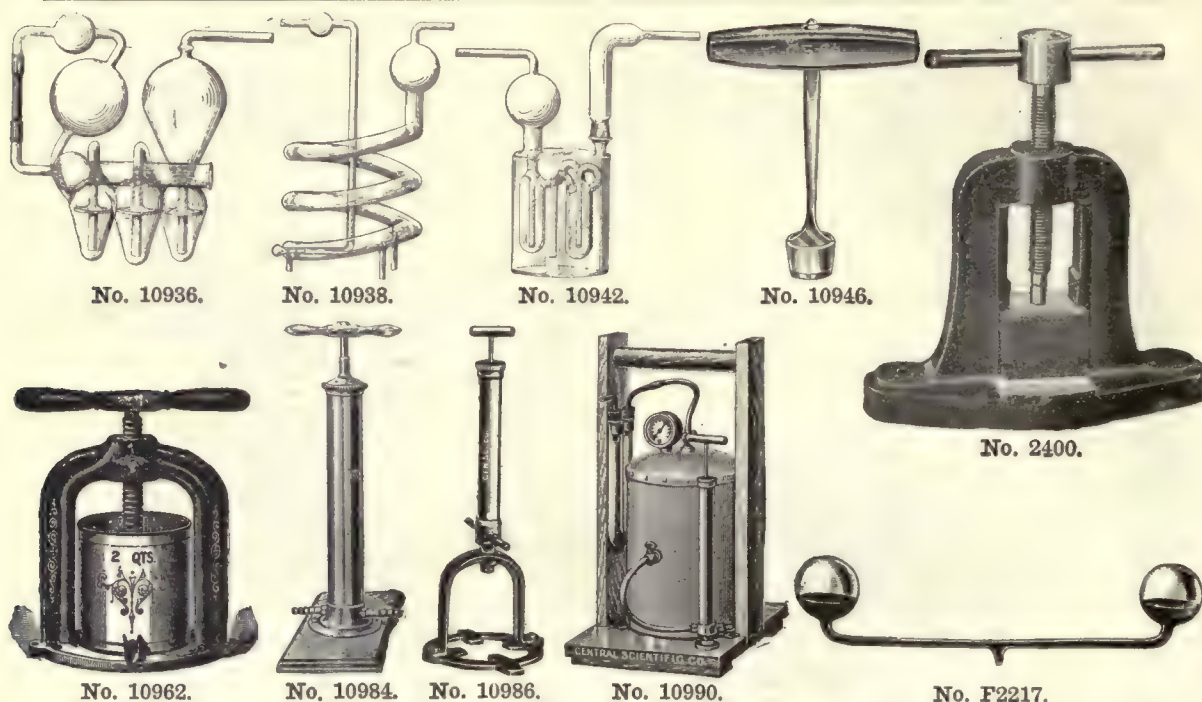
POLISHING HEADS, Electric, for either A. C. or D. C. Will meet all requirements for light grinding, buffing, etc. Motor enclosed, protecting all working parts from flying dust and dirt. Bearings are made of extra heavy phosphor bronze, steel shaft $\frac{1}{2}$ -inch in diameter. Lubrication is automatic by means of feed wick oil cups. Motor practically noiseless in operation. Has a speed of 3,000 r. p. m. and will develop $\frac{1}{8}$ h. p. Dimensions: height over all, $9\frac{1}{2}$ inches; base, 6x5 inches; length of shaft, $9\frac{1}{2}$ inches. Finished in black japan. Buffing attachment to hold small buffs for buffing wheel may be had. (See No. 10905.) Has emery wheel 5 inches in diameter, $\frac{1}{2}$ -inch face, indicating snap switch, attachment plug and six feet reinforced cord.

No.		A	B	C	D
		A. C.		D. C.	
	For volts	110	220	110	220
10902.	POLISHING HEADS , with adjustable tool rest.....	\$48.00	48.00	36.00	36.00
10904.	POLISHING HEADS , without tool rest.....	43.50	43.50	31.50	31.50
10905.	BUFFING ATTACHMENT , for either of the above Electric Polishing Heads.....				2.50
10906.	PULLEY , $2\frac{1}{4}$ inches in diameter, for $\frac{7}{32}$ -inch round belt, for attaching to shaft of Nos. 10902 and 10904				1.00

PORCELAIN WARE, see specific headings, Capsules, Crucibles, Dishes, Mortars, etc.

POTASH BULBS

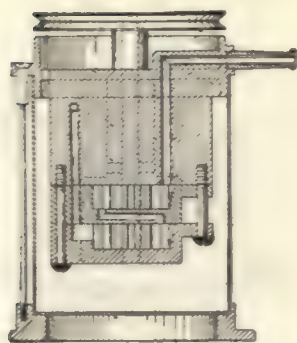
10910.	POTASH BULB , Bender & Holbein, with aluminum base.....	2.75
10911.	POTASH BULB , Bender & Holbein, glass parts only	2.50
10914.	POTASH BULBS , Bowen. No.	A B
	Size	small large
	Each	2.50 3.00
10916.	POTASH BULB , Geissler	1.50
10918.	POTASH BULB , Geissler, with drying tube ground on.....	2.00
3131.	POTASH BULB , Johnson, as used in Combustion Apparatus No. 3120.....	1.00
10922.	POTASH BULB , Liebig, with five bulbs.....	.50
10924.	POTASH BULB , Liebig-Dittmar, with trap .....	.80
10926.	POTASH BULB , Mitscherlich .....	.50
10928.	POTASH BULB , Norris, as used in determining sulphur in iron and steel.....	.60
10932.	POTASH BULB , Peligot, with three bulbs.....	.40
	POTASH BULB , Vanier, see Absorption Tubes.	



- No. 10936. **POTASH BULB**, Wetzel-Geissler, with drying tube attached by rubber tubing..... \$2.50
 10938. **POTASH BULBS**, Winkler, spiral form. No..... A B
 Height, mm 100 180
 Each 2.00 2.50
 10942. **POTASH BULB**, Zahradink, with drying tube ground on. Convenient to use as it stands easily on its own base..... 3.00
 For other **POTASH BULBS**, see **Absorption Bulbs and Tubes**.
POTASH BULB SUPPORTS, see **Supports**.
 10946. **POTATO CUTTER**, Ravenel, for cutting potato cylinders 18 mm in diameter and halving them at the same time..... 2.00
PRECIPITATING JARS, see **Jars**.
PRESS, Filter, see **Filter Press**.
 2400. **PRESS**, Pellet, for use in calorimetric determinations for briquetting powdered fuels.... 20.00
 10962. **PRESESSES**, Tincture, extra heavy, for making tinctures, extracts, etc.
 Capacity, quarts 1 2 4 8
 Each 2.00 2.50 4.00 6.00
PRISMS, see **Catalog F of Physical Apparatus**.
PROJECTION APPARATUS, see **Catalog F of Physical Apparatus**.
PROOFING CABINETS, see **Flour Testing Apparatus**.
PSYCHROMETERS, see **Hygrometers**.
 F2217. **PULSE or PALM GLASS**, Franklin's. Two glass bulbs with connecting tube, containing water and water vapor. When one bulb is held in the hand, the warmth of the hand is sufficient to cause rapid evaporation of the water, thus causing sufficient pressure to force the liquid into the other bulb, where a rapid boiling occurs. About 18 cm long..... .65
PUMPS, Acid, see **Acid Pumps**.
PUMPS, Air, Blowers, see general heading **Blowers**.
PUMPS, Air, Filter, see **Filter Pumps**.

AIR PUMPS, COMPRESSION AND VACUUM

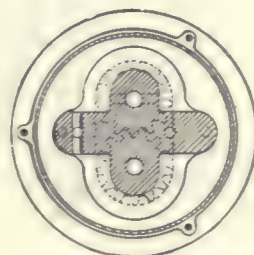
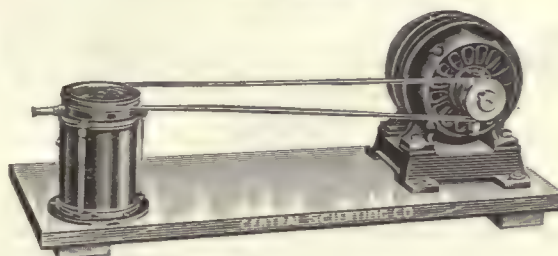
10980. **PUMP**, AIR, Compression. A so-called hand bicycle pump 13.5 cm long by 2 cm in diameter .50
 10984. **PUMP**, AIR, Vacuum and Pressure. Cylinder is of heavy brass, nickel-plated, 40 cm long by 54 mm in diameter. A vacuum to 29½ in. may be obtained by use of this pump. Mounted on an oak base..... 15.00
 10986. **PUMP**, AIR, Vacuum and Pressure. Useful in elementary work in the laboratory and where only a partial vacuum is desired. Cylinder is of brass, 28 cm long by 2.5 cm in diameter. Mounted on stirrup for ease in using..... 4.50
 10987. **EXTRA VALVE** for No. 10986 Air Pump..... .05
 For **PUMP PLATES**, see page 416.
 10990. **AIR TANK**, for use especially with Nos. 10984 or 10986 Air Pumps. A 12 liter air tank with a 30 lb. pressure gage mounted on a nicely finished hardwood base. For convenience in moving from place to place the support is provided with a handle and an air drying tube is mounted on one of the uprights as shown in the illustration. This apparatus may be used where air under pressure is needed, e. g., for driving stirrers in chemical laboratories. With stopcock at both air inlet and air outlet and with rubber tube for connection with Nos. 10984 or 10986.. 20.00



Vertical Section.



No. 11000.

Horizontal Section
through Gears.

No. 11002-3.

PUMPS, CENCO-NELSON HIGH VACUUM. These pumps represent the most recent development in High Vacuum Pumps for laboratory and commercial purposes. They are compact, operate with very small expenditure of power, require no attention when in operation and should last indefinitely. They measure about seven inches high by five inches in diameter at the base and weigh approximately ten pounds. The pulley is grooved for $\frac{1}{4}$ -inch round belt.

Cenco-Nelson Pumps consist essentially of rotating gears, in pairs, running in accurately fitting housings. The whole mechanism is immersed in a cistern of oil, which serves the double purpose of sealing all the joints air-tight, and of lubricating the moving parts.

The pumps are made with either two or three pairs of gears and are known as the two-stage and three-stage pumps respectively.

The Two-stage Pump contains two pairs of gears, arranged one above the other. The upper pair takes the air from the inlet tube and delivers it to the lower pair, which forces it out through the exhaust. The Three-stage Pump contains three pairs of gears arranged in the same way. The Three-stage Pump is capable of producing a higher vacuum than the Two-stage one.

When operating for any length of time, these pumps will become warm. As this raises the vapor tension of the oil, it is objectionable when a high vacuum is desired. To offset this effect, a cooling system is provided on the Three-stage Pump by means of which the oil is kept cool by circulation of water.

The most efficient speed of operation is between 800 and 900 r. p. m. At this speed the pumps give just as good results as when operated faster, and develop less heat.

For driving these pumps, a constant speed type of motor is most satisfactory; if for D. C., a shunt wound motor, or if for A. C., an induction motor. If a series wound (variable speed) motor is used, the speed of the motor will decrease as the vacuum rises, and the operator has no control over the speed, unless a rheostat is used in connection with the motor. A motor of $\frac{1}{8}$ horse power should be used for continuous duty.

Under favorable conditions, a vacuum of 0.1 mm may be obtained with the Two-stage Pump. On continuous service, some heating takes place, which lowers the vacuum somewhat. With the Three-stage Pump, water cooled, a vacuum of .05 mm may be obtained by using proper precautions.

The displacement of these pumps in free air, according to tests in our laboratory, is approximately 285 cu. in. per minute, or 10 cu. ft. per hour, at a speed of 900 r. p. m.

They will evacuate a flask of one liter capacity to a vacuum of 1 mm in two minutes.

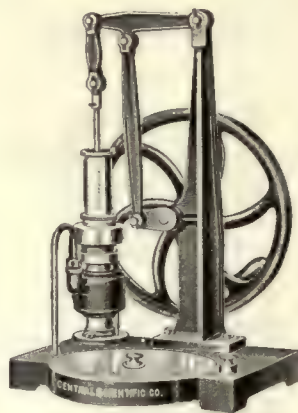
No.	A	B
Number of stages.....	2	3
Vacuum, mm.....	0.1	0.05
11000. PUMPS, CENCO-NELSON, unmounted.....	\$25.00	35.00
11001. PUMPS, CENCO-NELSON, on hardwood base, without motor.....	30.00	40.00
11002. PUMPS, CENCO-NELSON, on hardwood base with $\frac{1}{8}$ h. p., 110 volt A. C. Motor.....	60.00	70.00
11003. PUMPS, CENCO-NELSON, on hardwood base with $\frac{1}{8}$ h. p., 110 volt D. C. Motor.....	60.00	70.00



No. 10992.



No. 11010.



No. 10994.



No. 11012.

10992. **PUMP, AIR, Vacuum, Lever Action**, with two valves; polished brass cylinder, 56 mm diameter, stroke 16.5 cm; air pump plate of glass, 25 cm in diameter, ground plane and resting in a cast iron mold, with guard plug and vent screw; base and pillar of polished hardwood, mahogany finish. Base 25x60 cm. \$25.00
10994. **PUMP, AIR, Vacuum, Geryk Design**. This oil sealed pump is manufactured by us and has all the excellencies of this well-known design. It has no valves in the usual sense of the word, the pistons working in oil, which follows and seals the inlets and outlets so that leakage is impossible. The present model is finely constructed of brass and cast iron, handsomely finished, and is provided with a pump plate of plate glass 25 cm in diameter, cemented in the base. The air opening in the center of the pump plate is fitted with a safety plug which prevents the entrance of mercury and other undesirable substances, while permitting the free passage of air, and there is also another opening at the side of the base for attachment of pressure gages, etc. The piston is 48 mm in diameter with a 9 cm stroke and is operated by a hand wheel grooved for $\frac{5}{16}$ -in. round belt, as shown in the illustration. A vacuum of 0.15 mm may be obtained. 45.00
10995. **COUNTERSHAFT**, for use with No. 10994 Air Pump when it is desired to use electric motor drive. This countershaft is mounted on No. F197 Clamp and when used with a $\frac{1}{4}$ horse power motor of 1800 r. p. m. with a $1\frac{1}{2}$ -inch pulley, will drive No. 10994 at about 55 r. p. m. 7.50

AIR PUMP ACCESSORIES

11010. **AIR PUMP PLATE**, of iron, 20 cm in diameter, cast in one piece to minimize danger of leakage. Ground plane and provided with brass stop cock. The vent hole at the center is tapped ($\frac{7}{16}$ -16) for air pump accessories and provided with guard plug (No. F1941). 5.00
11012. **AIR PUMP PLATE**, of heavy plate glass, 25 cm in diameter; ground plane and firmly cemented in a low form tripod base of iron. The base is cast in one piece to minimize danger of leakage and provided with brass stopcock and brass connecting tube with oil-sealed taps for inlet of air and for manometer. Finest workmanship throughout. The vent hole at the center is tapped ($\frac{7}{16}$ -16) for air pump accessories and provided with a guard plug (No. F1941).. 12.00
- For **PRESSURE TUBING**, see general heading, **Rubber Tubing**.
11020. **OIL, Pump**. Especially adapted for lubricating air pump cylinders and for use in oil sealed pumps such as No. 10994. **Per half-pint can** .30
11022. **OIL, Pump**. Especially adapted for use in the Cenco-Nelson High Vacuum Pumps. In metal cans.
- | No. | A | B | C | D |
|---------------|-------|-------|--------|--------|
| Size | 1 pt. | 1 qt. | 1 gal. | 5 gal. |
| Per can | .25 | .35 | 1.25 | 5.00 |
11028. **VACUUM WAX**. The best preparation on the market for using on apparatus in connection with the Air Pump, especially where high vacua are desired. Will not injure the pump plate or apparatus. Will not harden and can therefore be easily removed. Superior to vaseline, tallow or heavy oil. **Per 4 oz. jar** .30



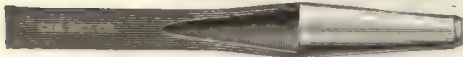
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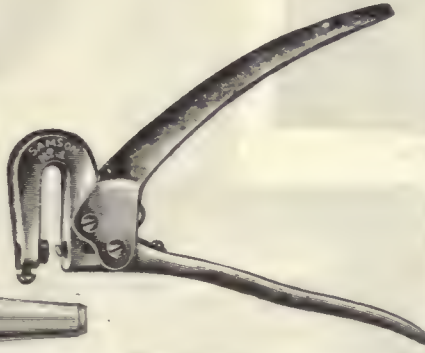
No. 11042.



No. 11054.



No. 11040.



No. 11044.



No. 11048.

11032. **PUMP, Little Giant Lift and Force**, for keeping the laboratory plumbing clean. Will clean and open any clogged waste pipe without removing connections. Works by vacuum and pressure, and will break up any solid waste or obstruction caused by chemical action in a few minutes. The pump is made of heavy brass with attachments of pure rubber. The cup is of steel, is non-collapsible and is of sufficient size to permit its use over 4-inch screen drains. An adjustable washer is furnished for use where the other cup will not fit. **\$6.00**

11040. **PUNCHES**, hollow cast steel.

Hole diameter, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Each .....	.15	.20	.30	.35

11042. **PUNCH**, spring, cast steel, double joint; for leather, etc. Length, $7\frac{1}{4}$ inches. **.50**

11044. **PUNCH, Paper, Samson**. The most powerful hand punch made; will perforate anything from a thin sheet of steel to $\frac{1}{4}$ -inch paper. Nickel-plated and fitted with $\frac{3}{16}$ -inch die. **2.50**

PURINOMETER, see **Urine Analysis Apparatus**.

11048. **PYCNOMETER, Drushel**, as used by the Bureau of Mines for measuring the specific gravity of small quantities of light petroleum distillates. (See Bulletin 125 of the United States Bureau of Mines)..... **1.00**

For other **PYCNOMETERS**, see **Specific Gravity Bottles**.

PYROMETERS

11054. **PYROMETERS. Brown Expansion**, operating through the difference in expansion of graphite rods and the steel stem enclosing them. A compensating device corrects for differences in the amount of stem immersed above 12 inches. The graduated dial is of porcelain, $6\frac{1}{2}$ inches in diameter, and is not affected by heat or gases. Furnished with a 36-inch stem which should be inserted in the heat up to 12 inches or more.

No.	A	B	C
Graduated to, degrees F.....	800	1200	1500
Each	16.50	22.00	27.50

Note:—Pyrometers No. 11054 can be furnished with dial graduated in corresponding Centigrade ranges if desired without additional charge. They may also be obtained with dial set for horizontal use of stem.

11058. **PYROMETERS. Brown High Resistance, Portable Type**, for use with either base metal or platinum thermo-couples. The scale is 5 inches long with mirror for accurate reading. A locking device is provided which automatically locks the pointer when the case is closed, preventing damage in handling or shipment. The instrument has a resistance of 600 ohms and its readings are independent of the length of lead wires. Complete with 15 feet double-conductor wire, in polished hardwood case with hinged cover, without thermo-couple.

No.	A	B	C	D	E	F	G	H	J
Range, 0 to degrees F.	800	1000	1200	1600	1800	2000	2400	2600	3000
Graduated to, deg. F.	5	10	10	10	20	20	20	20	25
Each	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50

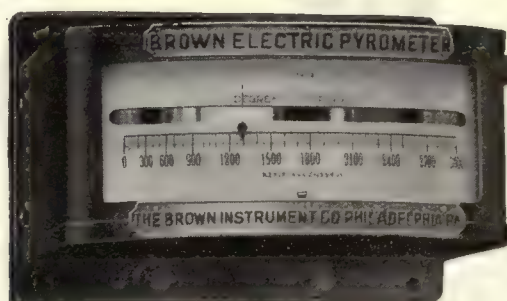
(For illustration of No. 11058, see next page.)



Nos. 11058-64.



Nos. 11072-4.



Nos. 11068-70.

11060. **PYROMETERS, Brown High Resistance, Portable Type**, same as No. 11058, but with scale graduated in Centigrade degrees.

No.	A	B	C	D	E	F
Range, 0 to degrees C.....	400	600	800	1000	1200	1600
Graduated to, degrees C.....	5	5	5	10	10	10
Each	\$82.50	82.50	82.50	82.50	82.50	82.50

11062. **PYROMETERS, Brown Low Resistance, Portable Type**, same as No. 11058, but with resistance of only 5 ohms, for use with base metal thermo-couples only.

No.	A	B	C	D	E
Range, 0 to degrees F.....	800	1000	1200	1600	1800
Graduated to, degrees F.....	5	10	10	10	20
Each	55.00	55.00	55.00	55.00	55.00

11064. **PYROMETERS, Brown Low Resistance, Portable Type**, same as No. 11062, but with scale graduated in Centigrade degrees.

No.	A	B	C	D
Range, 0 to degrees C.....	400	600	800	1000
Graduated to, degrees C.....	5	5	5	10
Each	55.00	55.00	55.00	55.00

11068. **PYROMETERS, Brown High Resistance, Permanent Type**, for wall use, with high resistance, which renders its readings independent of the length or temperature of the connecting wires. For use with either base metal or platinum thermo-couples. Resistance with base metal thermo-couples, 600 to 1000 ohms.

No.	A	B	C	D	E	F	G	H	J
Range, 0 to degrees F. 800	1000	1200	1600	1800	2000	2400	2600	3000	
Graduated to, deg. F. 5	10	10	10	20	20	20	20	25	
Each	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50

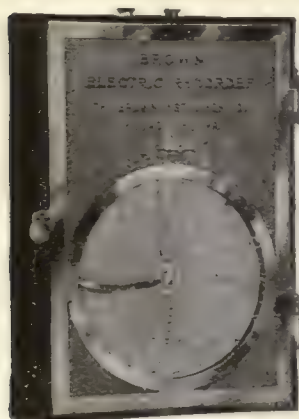
11070. **PYROMETERS, Brown High Resistance, Permanent Type**, same as No. 11068, but with scale graduated in Centigrade degrees.

No.	A	B	C	D	E	F
Range, 0 to degrees C.....	400	600	800	1000	1200	1600
Graduated to, degrees C.....	5	5	5	10	10	10
Each	82.50	82.50	82.50	82.50	82.50	82.50

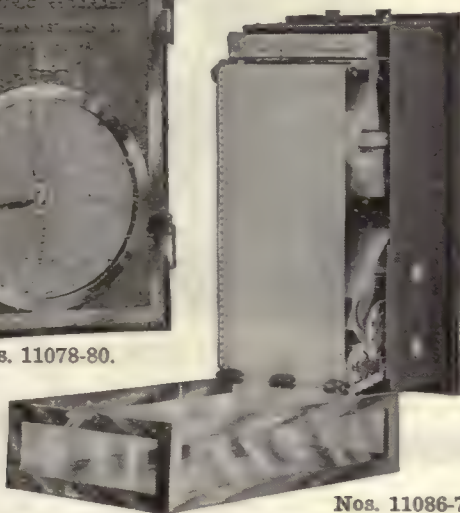
11072. **PYROMETERS, Brown Low Resistance, Permanent Type**, for wall use, with resistance of 5 ohms, for use with base metal thermo-couples only. Length of scale, 6 inches.

No.	A	B	C	D	E
Range, 0 to degrees F.....	800	1000	1200	1600	1800
Graduated to, degrees F.....	5	10	10	10	20
Each	55.00	55.00	55.00	55.00	55.00

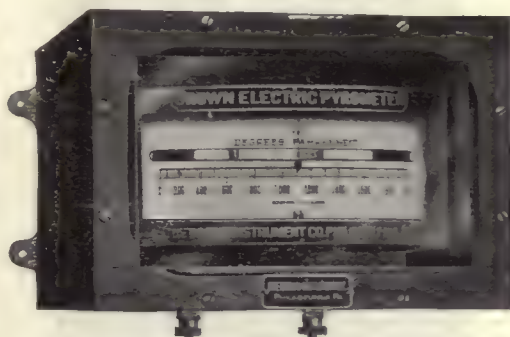
Note:—A smaller instrument with 4½ inch scale can be supplied if desired at \$5.00 less.



Nos. 11078-80.



Nos. 11086-7.



No. 11092.

11074. **PYROMETERS, Brown Low Resistance, Permanent Type**, same as No. 11072, but with scale graduated in Centigrade degrees.

No.	A	B	C	D
Range, 0 to degrees C.....	400	600	800	1000
Graduated to, degrees C.....	5	5	5	10
Each	\$55.00	55.00	55.00	55.00

See note under 11072.

11078. **PYROMETERS, Brown High Resistance, Recording Type**, for use with either base metal or platinum thermo-couples. Complete with 8-day clock, 100 twenty-four hour parchment charts and 50 feet double-conductor wire, but without thermo-couple.

No.	A	B	C	D	E	F	G
Range, 75 to, degrees F.....	800	1200	1600	2000	2400	3000	3600
Graduated to, degrees F.....	20	25	25	50	50	50	20
Each	137.50	137.50	137.50	137.50	137.50	137.50	137.50

11080. **PYROMETERS, Brown High Resistance, Recording Type**, same as No. 11078 but with scale graduated in degrees Centigrade.

No.	A	B	C	D	E	F
Range, 25 to, degrees C.....	400	600	800	1000	1200	1600
Graduated to, degrees C.....	5	10	10	20	25	25
Each	137.50	137.50	137.50	137.50	137.50	137.50

11086. **PYROMETERS, Brown Recording, Continuous Type**, for use where a continuous record of the temperature is desired over long periods of time. An 8-day clock mechanism operates the record roll, over which passes a two months' roll of carbon paper. A pointer strikes the carbon band once a minute and produces the record. No ink is required. Complete with one roll of carbon and one of record paper, and with 50 feet of double conductor wire.

No.	A	B	C	D
Range, 75 to, degrees F.....	800	1200	2000	3000
Graduated to, degrees F.....	5	10	25	50
Each	220.00	220.00	220.00	220.00

11087. **PYROMETERS, Brown Recording, Continuous Type**, same as No. 11086, but with chart graduated in degrees C.

No.	A	B	C
Range, 25 to, degrees C.....	800	1200	1600
Graduated to, degrees C.....	10	10	20
Each	220.00	220.00	220.00

11088. **EXTRA CHART ROLLS** for Nos. 11086-7.....each 2.75

11089. **EXTRA CARBON MARKING ROLLS** for Nos. 11086-7.....each .55

PYROMETER, Brown Precision Heatmeter, write for special information.

PYROMETER, Brown Transformation Point, for determining the recalcence and decalcence points of steel, write for special bulletin.

11092. **PROTECTING CASES, for Brown Pyrometers, Permanent Type**, of polished hardwood with glass front, with brackets for fastening to wall. Price includes mounting of instruments in case before shipment, but not price of instruments.

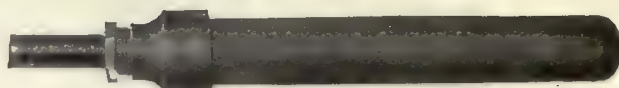
No.	A	B
For Pyrometer, type.....	high resistance	low resistance
Each	6.60	6.60



No. 11093.



No. 11096.



No. 11106.



No. 11100.



No. 11102.

11093. **PROTECTING CASES**, similar to No. 11092, but intended to contain both Pyrometer and switchboard. The switch handle extends through the glass door, and is provided with a stuffing box to make the opening dustproof. As the contacts wear, the spring tension can be tightened up without opening the case. Price includes mounting of instruments and switchboard in case before shipment, but not price of instrument or switchboard.

No.	A	B
For Pyrometer, type.....	high resistance	low resistance
Each	\$8.25	8.25

Note:—Nos. 11092 and 11093 should be ordered when the Pyrometer is ordered, as it must be mounted at the factory.

11096. **SWITCHBOARDS**, for use with Brown Pyrometers where several thermo-couples are to be connected to the same Indicating or Recording Pyrometer. This is a rotary switch with positive spring contacts, the tension of which may be taken up as the contacts wear.

Number of points.....	2	4	6	8	12	16
Each	6.60	7.70	8.80	9.90	12.10	14.30

11100. **THERMO-COUPLES**, Base Metal, for use with Nos. 11058 to 11088, for measuring temperatures up to 1800°F., and for intermittent use up to 2000°F. The couple consists of two 1/8-inch rods of nickel alloy welded together at one end and insulated throughout their lengths by asbestos for temperatures up to 1000°F., and by lava above that temperature. Complete with head and binding posts for attaching lead wires, and with protecting tube of steel pipe unless otherwise specified. With adjustable flange. Length, 24 inches..... 8.80

Note:—For lengths above 24 inches.....per foot, add 1.10

11102. **THERMO-COUPLES**, Platinum, for use with Nos. 11058 to 11088, for temperatures up to 3000°F., or 1600°C. The couple consists of one wire of chemically pure platinum and one of an alloy of platinum with 10 per cent. rhodium, of a diameter of 0.02 inch. The wires are insulated by small fire-clay tubes pierced with two holes. Complete with iron head and porcelain block with binding posts, and with protecting sheath of porcelain. (If specified in ordering, a quartz sheath may be furnished instead of porcelain.)

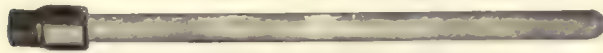
Length, inches	12	18	24	36
Each	38.50	50.60	60.50	79.20

11106. **PROTECTING TUBES**, Graphite, for Thermo-Couples, for protection from molten metals.

Length, inches.....	12	18	24	36
Each	3.30	4.40	6.60	8.80

11108. **PROTECTING TUBES**, Nickel-Chromium, for base metal thermo-couples for use at temperatures between 1500° and 2000°F. They may also be used in lead hardening baths, and as an additional protection over porcelain or quartz tubes.

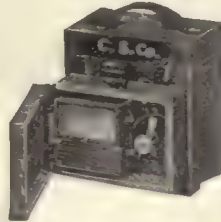
Length, inches	12	18	24
Each	5.50	8.80	12.10



No. 11112.



No. 11140.



No. 11140.



Nos. 11130-2.

11112. **PROTECTING TUBES**, Porcelain, for Platinum Thermo-Couples, with a melting point of 3600°F. They should not be subjected to sudden changes of temperature.

Length, inches.....	12	18	27	39
Each	\$4.40	5.50	7.45	11.00

11118. **PROTECTING TUBES**, Quartz, for use where sudden fluctuations in temperature are met with, or where a tube with very small lag is desired. Melting point, about 2400°F.

Length, inches.....	12	18	27	39
Each	3.85	4.40	5.25	7.15

11120. **PROTECTING TUBES**, Steel, for Base Metal Thermo-Couples, to protect from gases, etc. They should not be used at temperatures above 1400°F., nor in an oxidizing atmosphere.

No.	A	B
Diameter outside, inches.....	$\frac{7}{8}$	1 $\frac{1}{4}$
Per foot .....	.55	.83

11122. **PROTECTING TUBES**, Calorized Steel, subjected to calorizing which increases the life of the steel when used at high temperatures.

Length, inches.....	12	18	24	36
Each	2.75	3.30	3.85	4.95

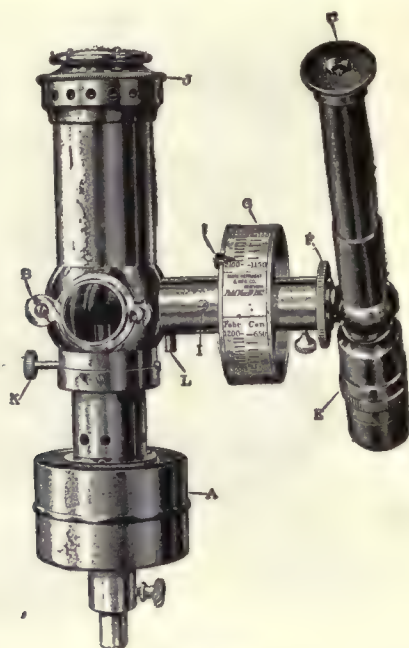
11130. **PYROMETERS**, Hoskins Low Resistance, Portable Type, complete with 36-inch thermo-couple of Alumel and Chromel wires, twisted and welded together. The special feature of this outfit is the fact that the operator can easily make his own thermo-couples, when replacement is necessary. The Alumel and Chromel wires can be obtained in coils of various gages, so calibrated that all couples made from two given coils are interchangeable. The ends of the wires should be twisted together and welded, and are then ready for use. Complete with low-resistance portable indicator in black enameled aluminum case 6 $\frac{1}{4}$ x6x3 inches, weighing 5 pounds; 36-inch standard thermo-couple; and 20 feet of flexible leads.

No.	A	B	C	D
Range, 32 to, degrees F.....	1000	1500	2000	2500
Graduated to, degrees F.....	10	20	20	25
Each	47.00	47.00	47.00	47.00

11132. **PYROMETERS**, Hoskins Low Resistance, Portable Type, same as No. 11130, but with scale graduated in Centigrade degrees.

No.	A	B	C	D
Range, 0 to, degrees C.....	550	800	1100	1400
Graduated to, degrees C.....	5	10	10	20
Each	47.00	47.00	47.00	47.00

11140. **PYROMETER**, Scimatco Optical, Patented, for measurements of temperatures from 1200° to 7200°F. With this instrument, direct observation is made of the object whose temperature is to be measured. The instrument can be readily standardized by the operator in a few minutes time. There are no errors due to connecting wires, cold junctions, temperature changes, or sensitive electrical instruments. The life of the instrument with ordinary care is indefinite, and the only cost of upkeep is that of recharging the storage battery. Especially suited for use in foundries, blast furnaces, steel works, glass factories, smelters, gas works, brick and tile factories, porcelain factories and in research work on high temperatures. Complete with tripod, storage battery, current regulator, 3 extra lamps and bottle of amyl acetate, in two carrying cases. Range, 800° to 2000°C..... 175.00



No. 11154.



Nos. 11162-5.

11142. **PYROMETER, Scimatco Optical**, same as No. 11140, but with scale graduated from 1400° to 3600°F \$175.00

Note:—Higher ranges can be supplied if desired.

11154. **PYROMETERS, Shore's Pyroscope**, for measurement of temperatures by comparison of the color of the heated object with that of a kerosene flame. This instrument was designed especially for the heat treatment of steel and for brass foundry work, but can be used for any measurements within the ranges given. The instrument is self contained and easily portable, requiring no batteries or electrical connections of any kind. The entire operation consists in focusing the telescope upon the object whose temperature is to be measured, turning the knob which operates the diaphragm until the difference in color disappears and then reading the temperature from the graduated drum. Complete with instrument as described, and with small and large tripods for mounting at convenient height.

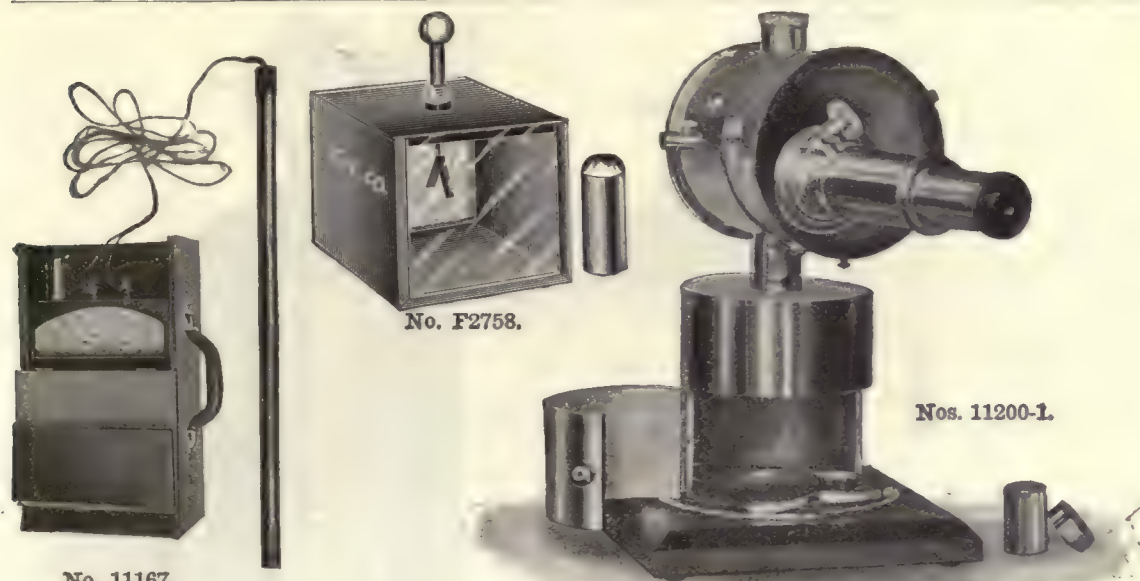
No.	A	B
Range, degrees F.....	1200-2100	2000-3000
Each	65.00	65.00

11162. **PYROMETERS, Thwing Radiation, Portable Type**, for measurements of temperatures of objects in furnaces, of objects in motion, or in inaccessible places, by means of the heat radiated from the object. The instrument consists of a **Receiving Tube** for collecting the radiation and concentrating it upon a sensitive thermo-couple, and a **Galvanometer** to measure the current thus generated. The design of the tube makes it independent of the distance from the hot body, provided the surface is of sufficient area to fill the angle formed by the opening in the tube. The instrument is very rapid, requiring an interval of only 5 seconds before a reading may be made after the tube is pointed at the object. Convenient for use in cement kilns, open hearth furnaces, carborundum furnaces, electric furnaces, brick kilns, lime kilns, smelting furnaces, coke ovens, boiler fire pits, hardening furnaces, etc. It should not be used for gases, flames or transparent bodies, nor where there is much smoke or flame. Complete with tube 30 inches long divided in two sections, portable indicator in aluminum case with 4-inch scale with zero adjustment, and with connecting cord.

No.	A	B	C	D	E	F	G
Range, degrees F...	500-1400	800-1800	1000-2500	1400-2500	1200-2800	1000-3000	1400-3500
Each	135.00	135.00	135.00	135.00	135.00	135.00	135.00

11163. **PYROMETERS, Thwing Radiation, Portable Type**, same as No. 11162, but with double scale; graduated in Fahrenheit degrees.

No.	A	B	C	D	E
Range, degrees F.....	1000-2500	600-1650	500-1500	400-1200	600-1800
	1800-3600	1000-3000	1000-2500	800-2800	1200-3600
Each	145.00	145.00	145.00	145.00	145.00
No.	F	G	H	J	
Range, degrees F.....	1000-2500	600-1600	300-1000	800-2200	
	2000-4500	1200-2800	1000-3000	1500-3200	
Each	145.00	145.00	145.00	145.00	



No. F2758.

Nos. 11200-1.

No. 11167.

11164. **PYROMETERS, Thwing Radiation, Portable Type**, same as No. 11162, but with scale graduated in Centigrade degrees. No. A B C
 Range, degrees C..... 600-1500 500-1700 1000-2000
 Each \$135.00 135.00 135.00
11165. **PYROMETERS, Thwing Radiation, Portable Type**, same as No. 11164, but with double scale; graduated in Centigrade degrees.
- | No. | A | B | C | D | E | F | G |
|---------------------|----------|----------|-----------|----------|-----------|-----------|-----------|
| Range, degrees C... | 200-800 | 500-1400 | 1000-2000 | 500-1000 | 600-1500 | 500-1700 | 500-1800 |
| | 500-1700 | 800-2000 | 1500-4000 | 600-1500 | 1000-2500 | 1500-3000 | 1200-3000 |
| Each | 145.00 | 145.00 | 145.00 | 145.00 | 145.00 | 145.00 | 145.00 |
11166. **CARRYING CASE** for Nos. 11162-11165, with leather handles..... 10.00
11167. **PYROMETERS, Thwing Radiation, Portable Type**, for laboratory use, in polished mahogany case, with 6-inch scale. Ranges for this instrument are the same as those given under Nos. 11162 to 11165.
- | No. | A | B |
|------------|--------------|--------------|
| Type | single scale | double scale |
| Each | 145.00 | 155.00 |

In ordering, kindly specify scale and range desired. See Nos. 11162 to 11165.

11168. **PYROMETERS, Thwing Radiation, Permanent Type**, same as No. 11162, but with wall type indicator and ventilated receiving tube for permanent installation. With either single or double scales, graduated in Fahrenheit or Centigrade degrees. Write for information as to ranges and prices.

Note:—Thwing Radiation Pyrometers may be secured with other ranges than those listed, and with triple range scales if desired. We shall be glad to furnish information and prices upon request. Send for special bulletin containing full description.

QUARTZ APPARATUS, Transparent, see general headings, **Crucibles, Dishes, Flasks**, etc.

RACKS, All Kinds, see **Supports**.

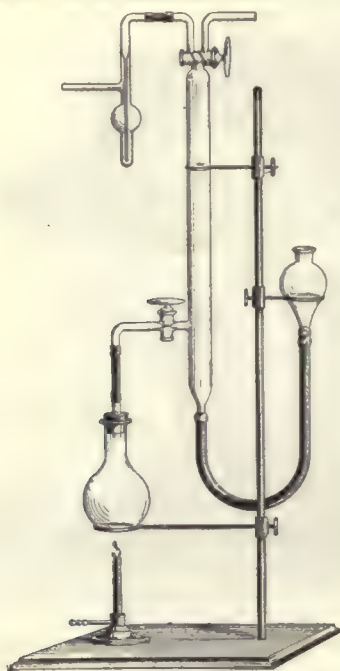
RACKS, Milk Test Bottle, see **Milk Testing Apparatus**.

RADIO-ACTIVITY APPARATUS

- F2758. **ELECTROSCOPE, Box Form**. Consists of a metal box about 10x10x10 cm with removable glass front and back. The brass rod carrying the strips of gold-foil is insulated by pure amber, giving the best insulation possible. To obviate radio-active influences, a metal cap is provided to fit over the collar on top of the box and enclose the projecting rod. This electroscope will retain its charge for from 6 to 8 days..... 4.00

ELECTROSCOPE, Lind Interchangeable, as used by the United States Bureau of Mines. This instrument can be assembled to suit the needs of the operator from the parts described below. (See Bulletin 104, United States Bureau of Mines, Chapter V.)

11200. **ELECTROSCOPE HEAD**, consisting of a nickel-plated housing containing the leaf system and supporting the reading microscope. It is closed in the front and rear by sheet mica. A fine wire grating makes contact with the mica to ground stray charges. The leaf system is insulated by means of an amberoid plug, fitted into a threaded cap, by means of which the leaf may be readily removed. The aluminum leaf is charged by means of a rod set in hard rubber at the right-hand side. Opposite, on the left, is a protector for the leaf when in transportation, which should be withdrawn to full distance when in use. At the bottom of the leaf support is a light spring, to make electrical contact with the interchangeable discharge chambers.



No. 11208.



No. 11203 with No. 11200 mounted on it.

ELECTROSCOPE HEAD, Continued.

The Microscope, magnification, 24-fold; focal distance 32 mm, is carried by a projecting solid front, and is very firmly fixed with relation to the leaf. It may be refocused, however, by releasing a split collar controlled by a heavy milled-head screw. The microscope has a graduated and numbered micrometer scale in the eye-piece by which the motion of the leaf is measured.

The Head as a whole comprises a very compact readily transportable unit, and yet one that can be easily taken apart if it is desired to do so. Complete as described..... \$63.00

11201. **OPEN DISCHARGE CHAMBER FOR SOLIDS**, a cylinder for use with Head No. 11200, 10.5 cm high, 9 cm in diameter, with a door 5 cm high, and 9 cm broad. The plate electrode is 5.5 cm in diameter and is supported horizontally at 1.5 cm below the top of the chamber, by a rod that passes up through an amberoid insulator, and terminates in a cap to fit the interchangeable top. The chamber is provided with a friction cap to protect the insulator when not in use..... 15.00
11202. **GAS-TIGHT EMANATION CHAMBER**, for use with Head No. 11200, 10.5 cm high, 9 cm in diameter, provided with two special gas-tight stop-cocks. Volume, about $\frac{1}{2}$ liter. The amberoid insulation is made gas-tight by a special mechanical joint without any wax or other binding material. Since each emanation chamber can be used only once daily, as many duplicates must be provided as it is desired to make daily determinations, all being used with one top. At least one extra Charging Cap No. 11210 is needed with more than one chamber. 18.75
11203. **LIGHT WALLED WATER CHAMBER**, height, 13 inches; diameter, 10 inches; weight, 4 pounds; capacity, about 4 gallons. Intended especially for field use with Head No. 11200, where water is introduced directly into the chambers. Amberoid insulation, stop-cock outlet above, and large opening below, with rubber stopper for introduction of water..... 15.00
11204. **HEAVY WALLED WATER CHAMBER**, for use with Head No. 11200. Height, 13 inches; diameter, 10 inches; weight, 13 pounds; capacity, about 4 gallons. Intended for laboratory use, the walls being rigid enough to support a complete vacuum for the boiling-off method. Water can also be introduced directly if desired. Price quoted upon application.
11205. **PLATE FOR SOLIDS**, 5.5 cm in diameter with narrow rim 2 mm deep, to be used with No. 11201. At least two, and probably more, are desirableeach 1.25
11206. **CHARGING ROD**, a tapering rod of hard rubber 8 inches long, for charging in field work and where battery is not available..... .50
11207. **BATTERY SET**, consisting of dry cells connected in series, in covered wooden box, with insulated wire to guard one end of battery, charging wire with floating terminal and knife switch to protect whole. Dimensions of box, 18x15x6 inches..... 43.00
11208. **GAS BURETTES FOR EMANATION**, a glass burette with one capillary two-way stop-cock above and one wide-bore cock below. Length of burette, 60 cm; diameter, 3 cm; length over all, 80 cm. Two are desirable for rapid workeach 10.00
11209. **MICRO-DRYING BULBS for Sulphuric Acid**, to be used between Nos. 11202 and 11208 in transferring gases. One is needed for each gas burette..... 1.50
11210. **CHARGING CAP**, of hard rubber with binding post, to be used in maintaining charge on No. 11202 when Head No. 11200 is in use..... 1.50
11211. **HAND PUMP, Vacuum or Pressure**, of special construction for use in evacuating No. 11202 Chamber 10.00



No. 11244.

11212. **WRENCH** for removing electrode collars from Chambers Nos. 11201 to 11204..... **\$1.10**
 6036. **ALUMINUM Foil**, in books of 25 leaves, 5x5 inches.....per book .45
 11214. **WOODEN SUPPORT** for No. 11200, when not on chamber..... **3.00**
 11215. **WOODEN CASE** for Field Sets Nos. 11224, 11230, 11232 and 11234..... **8.00**
 12962. **STOP WATCH**, 7 jewelled..... **12.50**
 11217. **ANALYZED LE DOUX PITCH BLEND** (about 60% U3 O8), with Radium data, to be used in calibrating Chambers No. 11202 directly in terms of radium emanation, by the solution and boiling method. Enough for 50 calibrations..... **4.00**
 11218. **ANALYZED DE DOUX CARNOTITE** (about 1.5% U3 O8), to be used in No. 11205 Plates in Chamber No. 11201 for solid comparison.....per 25 grams **1.50**
 11219. **ANALYZED LE DOUX CARNOTITE** (about 2% U3 O8).....per 25 grams **2.00**
 11220. **ANALYZED LE DOUX CARNOTITE** (about 3% U3 O8).....per 25 grams **3.00**

RECOMMENDED SETS.

11224. **COMPLETE FIELD OUTFIT** for Ores, consisting of one each Nos. 11200, 11201, 11206, 11212, 6036, 11218, 11219, 11220, 11215, 12962, and two No. 11205..... **105.75**
 11226. **COMPLETE LABORATORY OUTFIT** for Solids, Gases (Emanation Method) and Liquids (Water), consisting of one each Nos. 11200, 11201, 11206, 11207, 11211, 11212, 6036, 11214, 11217, 11218, 11219, 11220, and two each Nos. 11202, 11205, 11208, 11209 and 11210..... **182.50**
 11228. **SIMPLE LABORATORY OUTFIT** for Solids, Gases and Liquids, without battery set, pump, water chamber, and stop watch, consisting of one each Nos. 11200, 11201, 11202, 11206, 11208, 11209, 11210, 11212, 6036, 11214, 11217 and 11219 **126.75**
 11230. **COMPLETE LABORATORY AND FIELD OUTFIT** for Water Analysis, consisting of one each Nos. 11200, 11203, 11206, 11208, 11209, 11210, 11211, 11212, 6036, 11214, 11215, 11217 and 11219 **120.00**
 11232. **SIMPLE LABORATORY AND FIELD OUTFIT** for Water Analysis, consisting of one each Nos. 11200, 11203, 11204, 11206, 11212, 6036, 11215 and 11217 **110.00**
 11234. **SIMPLE FIELD OUTFIT** for Water Analysis, consisting of one each Nos. 11200, 11203, 11206, 11212, 6036, 11215, 12962 and 11217..... **100.00**
 11244. **ELECTROSCOPE**, Lind Gamma Ray, as used by the United States Bureau of Mines. This is a single unit outfit, not interchangeable, consisting of a nickel-plated brass cylinder 13 cm high and 9 cm in diameter, with lead lining inside 3 mm thick. The leaf system is in the discharge chamber itself, into which is also fixed, by means of a split collar with heavy screw, the reading microscope with numbered scale. The chamber is mounted on one end of a wooden base 33 x 6 inches, along which extends a nickel-plated track 27 inches long on which a light carriage support for the radium tube may be fixed by a binding screw at any desired distance from the discharge chamber. The carriage supports the radium tube horizontally at a height just opposite the middle of the chamber. The radium tube is held by a light spring clip against a concave bar, graduated in $\frac{1}{16}$ inch divisions, to facilitate centering the tube and determining its length. A removable lead screen 6 x 6 x $\frac{1}{4}$ inches is placed immediately against the discharge chamber, to shield it from the radium tube. Complete as described. (See Bulletin 104, of the United States Bureau of Mines, Chapter V)..... **80.00**
 11246. **ELECTROSCOPE**, Gamma Ray Outfit, for the measurement of tubes of radium or of emanation, suitable for use by physicians and hospitals, consisting of Gamma Ray Electroscop No. 11244, Stop Watch No. 12962 and Charging Rod No. 11206 **95.00**

MINERALS FOR RADIO-ACTIVITY

11250. **CALC-SPAR**, in pieces about 40 x 15 x 6 mm.....per piece **.75**
 11251. **CARNOTITE (Radium Ore)**. High grade specimens.
 No. **A** **B** **C**
 Size Small. Medium. Large.
 Each75 1.50 2.25
 11252. **FLUORSPAR CUBES**, approximately 13 mm on a side.....per cube **1.50**
 11253. **KUNZITE**, fluorescentper 6 grams **1.50**
 11255. **THORIUM NITRATE**per ounce **1.10**



No. 11280.



No. 11284.



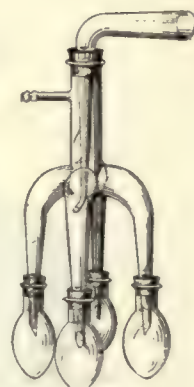
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No. 11300.

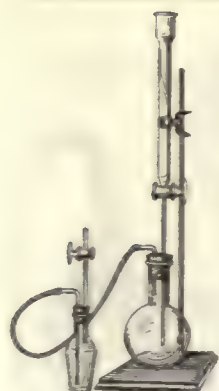


No. 11304.



No. 11308.

11258. **URANIUM NITRATE**per ounce \$0.60
11259. **URANIUM OXIDE** (yellow).....per ounce .50
11261. **WILLEMITE**, Fluorescentper ounce .75
11262. **WILLEMITE**, Phosphorescentper ounce 1.50
11264. **ZINC SULPHIDE, PHOSPHORESCENT**, extra strong phosphorescence; produces very large scintillations with radium. In vials of 5 grams.....Per vial 2.00
11265. **ZINC SULPHIDE, PHOSPHORESCENT**, strong phosphorescence. In vials of 5 grams.
.....Per vial 1.00
11266. **ZINC SULPHIDE, TRIBOLUMINESCENT**. Shows a marked luminosity when rubbed; is also phosphorescent. In vials of 5 grams.....Per vial 2.00
11268. **FLUORESCENT SCREEN**, 65 x 45 mm..... 1.60
11280. **RADIOSCOPE**, for detecting the presence of radio-activity in waters, ores, etc., by viewing scintillations on a phosphorescent screen. These scintillations are produced by the alpha particles emitted by the emanation evolved from radio-active substances. The instrument consists of a jar for holding the substance under test, provided with a screw cap fitted with an adjustable compound lens and a phosphorescent zinc sulphide screen. The emanation rises from the jar into the cap and there causes scintillations on the screen. With each Radioscope is supplied a quantity of high grade carnotite (radium) ore which may be used to learn the use of the instrument. Size 20x7.5 cm..... 10.00
11284. **SPINTHARISCOPE**, for showing the radiant energy of radium salt. Consists of a nickel-plated metal tube, 19x35 mm, with a phosphorescent screen at one end and a high grade lens at the other. Projecting from the center of the phosphorescent screen is a pin on the side of which has been placed a small quantity of radium salt. With this instrument the scintillations produced on the phosphorescent screen by the constantly emanating alpha particles are shown in the most marvelous manner. In order to observe this phenomenon in the day time the observer should remain in a darkened room for a short time, so that the eye may become sufficiently sensitive 4.00
- F2177. **RADIOMETER**, Crookes', illustrating phenomena of radiant heat. Mounted on glass base. —
- RAW MATERIALS**, see list at end of letter W.
- RAZORS**, Section, see Microtome Accessories.
- READING GLASSES**, see Magnifiers.
- READING TELESCOPES**, see Catalog F of Physical Apparatus.
- REAGENT BOTTLES**, see Bottles.
- RECALESCENCE OUTFIT**, see Furnaces, Electric; Pyrometers; or write for special information.
11300. **RECEIVERS**, Retort, glass, plain.
- | | | | | |
|-------------------|-----|-----|-----|------|
| Capacity, cc..... | 125 | 250 | 500 | 1000 |
| Each | .50 | .55 | .65 | .75 |
11304. **RECEIVERS**, Retort, glass, with tubulature and glass stopper.
- | | | | | |
|-------------------|-----|-----|------|------|
| Capacity, cc..... | 125 | 250 | 500 | 1000 |
| Each | .75 | .85 | 1.00 | 1.25 |
11308. **RECEIVER**, Pauly's, for distillation in vacuum. With adapter and four bulbs..... 3.00
- RECEIVERS** for Blowers, see Blowers.
- RECTIFIERS**, see Electrical Instruments.



No. 11316.



No. 11450.



No. 11452.



No. 11322A.



No. 11322B.



No. 11322C.



No. 11320.



No. 11472.



No. 11478.



No. 11462.

11314. **REDUCTOR**, Blair's, for the determination of phosphorus in steel, by the zinc filtration method. With glass stop-cock. (See Blair's Analysis of Iron, 8th Edition, page 89).. \$2.00
11316. **REDUCTOR**, Blair's, same as No. 11314, but complete with support, clamp, two flasks, glass stop-cock, and connecting tubes..... 6.00
11320. **REDUCTION TUBE**, of Pyrex hard glass, with bulb on end. Length, 15 cm..... \$0.25
11322. **REDUCTION TUBES**, of Pyrex hard glass, with bulbs in center.

No.	A	B	C
Number of bulbs.....	1	2	3
Length, mm.....	300	350	400
Each.....	.30	.42	.50

For **REFRACTOMETERS** and **ACCESSORIES**, write for special information.

REGULATORS, Gas and Electrical, see **Thermo-regulators**.

REGULATORS, Gas Pressure, see Nos. 6530, 6556 and 7070.

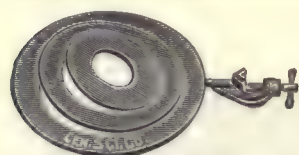
RESERVOIRS, Leveling, see **Bulbs**, Leveling, No. 1902.

11450. **RESPIRATOR**, for protection from dust, sawdust, smoke, fumes and gases. Made of soft rubber and provided with a perfect filter device; easily kept clean and bends perfectly to fit the face..... 1.75
11452. **RESPIRATOR or Face Mask**, of felted material so formed as to make an air-tight joint around the face, thereby protecting the eyes, nose and lungs from dust, smoke, fumes and gases. The filters, upon which the efficacy of the mask depends, do not need renewing and are guaranteed for three years. For the eyes there is a large celluloid or mica covered opening, permitting perfect vision to all points..... 10.00

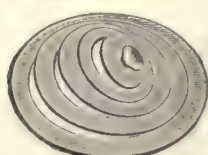
RETORT ADAPTERS, see **Adapters**.

RETORT RECEIVERS, see **Receivers**.

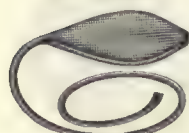
11462. **RETORTS**, Copper, for making oxygen; flask shape, with iron clamp and brass delivery tube fitted with ground joint.
- | | | | | |
|-------------------|------|------|------|------|
| Capacity, cc..... | 250 | 500 | 1000 | 2000 |
| Each..... | 2.30 | 3.40 | 4.15 | 5.60 |
- RETORTS**, Copper for distillation, see **Distilling Apparatus**.
11468. **RETORTS**, Glass, plain.
- | | | | | |
|-------------------|-----|-----|-----|------|
| Capacity, cc..... | 125 | 250 | 500 | 1000 |
| Each..... | .70 | .80 | .90 | 1.00 |
11472. **RETORTS**, Glass, tubulated, with ground glass stopper.
- | | | | | |
|-------------------|------|------|------|------|
| Capacity, cc..... | 125 | 250 | 500 | 1000 |
| Each..... | 1.00 | 1.10 | 1.25 | 1.80 |
11478. **RETORTS**, Iron, for distilling mercury, etc.; with removable cover, fastened by screw clamp, with delivery tube ground in the cover.
- | | | | | | |
|-------------------|------|------|------|------|------|
| Capacity, cc..... | 250 | 500 | 1000 | 2000 | 4000 |
| Each..... | 3.80 | 4.10 | 4.50 | 6.00 | 8.00 |



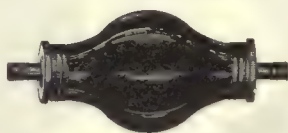
No. 11494.



No. 11498.



No. 6645.



No. 6832.



No. 11524.



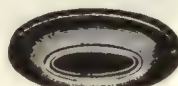
No. 11526.



No. 11502.



No. 11504.



No. 11536.



No. 11530.

RETORT, Iron, Skidmores, see No. 3440.

11484. **RETORTS, Transparent Quartz, plain.**

Capacity, cc.....	50	100	200
Each	\$15.00	20.65	38.40

REVOLUTION COUNTERS, see Speed Counters.

RHEOSTATS, see Electrical Instruments.

11492. **RINGS, Concentric, Copper, tinned inside, for water baths, with cover.**

Number of rings in set.....	3	4	5	6
Outside diameter of largest ring, inches.....	3 $\frac{3}{8}$	4 $\frac{1}{8}$	5 $\frac{1}{8}$	6 $\frac{1}{4}$
Per set.....	.30	.40	.50	.60

11494. **RINGS, Concentric, Iron, with two removable rings, with heavy screw for clamping on support for supporting water baths, sand baths, flasks, etc. Diameter of outside ring, 6 inches..** .40

11498. **RINGS, Concentric, Porcelain, with cover.**

Number of rings in set.....	5	6
Outside diameter of largest ring, cm.....	16	20.5
Per set.....	1.65	2.20

11502. **RINGS, Iron, for attaching to retort stands; with $\frac{5}{16}$ inch screw. Distance from rod to center of rings, 4 $\frac{1}{2}$ inches.**

Outside diameter, inches.....	2	3	4	5	6	7
Inside diameter, inches.....	1 $\frac{5}{16}$	2 $\frac{5}{16}$	3 $\frac{3}{8}$	4 $\frac{5}{16}$	5 $\frac{1}{4}$	6
Each .....	.20	.21	.22	.25	.26	.35

11504. **RINGS, Iron, Extension, for fastening to retort stand by means of Clamp Holders Nos. 2914 and 2916. Length of rod, 7 $\frac{1}{2}$ inches.**

Outside diameter, inches.....	3	4	5	6	7
Each .....	.12	.15	.18	.20	.25

RINGS, Suberite, see Cork Rings No. 3296.

RING STANDS, see Supports.

ROASTING DISHES, see Dishes, Roasting, No. 3864.

11512. **ROPE, Manila, good quality, $\frac{3}{8}$ -inch diameter. (No order taken for less than 12 ft.) .Per foot** .04

RUBBER GOODS

RUBBER BAGS, see Gas Bags No. 6720.

11520. **RUBBER BANDS, assorted, in $\frac{1}{4}$ pound boxes.....Per box** 1.00

RUBBER BOTTLES, see Bottles.

11524. **RUBBER BULBS, for dropping pipettes, etc.**

Capacity, cc.....	2	5
Each .....	.04	.05

11526. **RUBBER BULBS, large size, heavy walled, for pipettes, etc.**

Capacity, cc.....	25	50
Length, inches.....	3	3 $\frac{1}{2}$
Diameter, inches	1 $\frac{1}{2}$	2
Each .....	.15	.20

11530. **RUBBER BULB, with hard rubber valves, for pressure only, with connecting tube. Capacity, about 50 cc.....** .30

RUBBER BULB EXPANDER, see No. 11630.

6645. **RUBBER BULB, of pure gum, with flexible tube for use with gas analysis apparatus..** .60

6832. **RUBBER BULB, with double valves of hard rubber for use in sampling gas for analysis** .60

RUBBER BULBS, double, for pressure, see Blower No. 1382.

11536. **RUBBER CAPS, flat shape, for test tubes of same diameter as caps.**

Diameter, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Per dozen.....	1.00	1.05	1.10	1.20



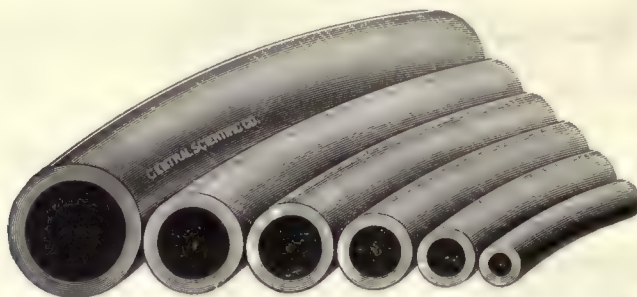
11540. RUBBER CEMENT, for cementing rubber joints, rubber, etc.....Per ounce bottle \$0.15
11544. RUBBER DAM, pure gum.....Per square foot .20
11546. RUBBER DAM, pure gum, 36 inches wide.....Per linear foot 1.00
- RUBBER DISKS for Foot Bellows, see Blowers.
- RUBBER FINGER COTS, see Finger Cots, Rubber No. 5514.
- RUBBER FUNNELS, see Funnels.
- RUBBER GLOVES, see Gloves.
11552. RUBBER POLICEMEN, narrow shape, for removing precipitates from walls of beakers, etc.; flat end, $\frac{1}{8} \times 7\frac{1}{16}$ inch. Complete with glass rod $6 \times 3\frac{3}{16}$ inchesEach .09
Per dozen .90
11553. RUBBER POLICEMEN. Same as No. 11552, but without glass rod.....Per dozen .45
11556. RUBBER POLICEMEN, wing shape, with rubber $1\frac{1}{8}$ inches wide at end. Complete with glass rod $6 \times 3\frac{3}{16}$ inchesEach .09
Per dozen .90
11557. RUBBER POLICEMEN. Same as No. 11556, but without glass rod.....Per dozen .70
11562. RUBBER SCRAPER for seraping precipitates from the walls of beakers, etc. Hard rubber handle with soft cone shaped rubber tip..... .20
11566. RUBBER SHEETING, white, 36 inches wide.....Per yard 1.20
- RUBBER SPATULAS, see Spatulas.
11572. RUBBER STOPPERS, made from best quality of rubber especially for chemical laboratory use; will not harden from age. Each size furnished in three styles—solid, one hole or two holes.Per pound 1.80

Table Showing Approximate Number of Rubber Stoppers in One Pound.

Number	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Diameter large end, mm.	14	17	18	20	23	25	27	32	37	41	45	50	56	63	68
Diameter small end, mm.	9	12	15	16	18	20	23	26	30	33	37	42	48	53	61
Approximate Number in One Pound {															
Solid	120	80	60	55	42	33	28	20	15	12	11	8	6	5	4
1 hole	130	90	65	60	45	35	30	21	16	13	11	8	6	5	4
2 hole	138	94	70	64	47	38	32	22	17	14	12	8	6	5	4

7372. RUBBER STOPPERS, especially designed for use with Moisture Testers Nos. 7360 to 7364, to stand the high temperature existing in moisture test flasks; they are necessary when copper flasks are used.
- No. 5 6
- Per dozen..... 1.65 2.20

RUBBER TESTING APPARATUS, see Testing Machines.



RUBBER TUBING, ALL KINDS

Special Notice. Rubber Tubing of the various kinds listed comes in original 12 foot lengths from the manufacturer, and is sold only in lengths of 3 feet or multiples of 3. This enables us to avoid the waste due to short pieces of unsalable lengths and permits us to sell the tubing to our customers at a reasonable price, without the necessity of a charge to cover the loss.

11580. RUBBER TUBING, White, light wall, cloth impression. This tubing is recommended for general laboratory use where an inexpensive tubing is desired.

Diameter inside, inches.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{5}{64}$
Per foot (see Special Notice).....	\$0.05	.07	.10	.12	.14	.24

11582. RUBBER TUBING, White, heavy wall, same quality as No. 11580. The $\frac{1}{4}$ inch size is the standard size and quality for Bunsen burner connections.

Diameter inside, inches.....	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{5}{64}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{7}{64}$	$\frac{1}{8}$
Per foot (see Special Notice).....	.13	.17	.20	.26	.36

11588. RUBBER TUBING, Red, Antimony, light wall. Retains its elasticity longer than No. 11580 and is preferred by many users for this reason.

Diameter inside, inches.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{5}{64}$	$\frac{3}{32}$
Per foot (see Special Notice).....	.06	.09	.12	.15	.21	.35

11590. RUBBER TUBING, Red, Antimony, heavy wall, same quality as No. 11588. Preferred by many users for Bunsen burner tubing in place of No. 11582.

Diameter inside, inches.....	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{5}{64}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{7}{64}$	$\frac{1}{8}$
Per foot (see Special Notice).....	.15	.22	.27	.36	.54

11594. RUBBER TUBING, Black, pure gum, light wall, seamless. This tubing will not bloom and is especially suited for gas analysis work.

Diameter inside, inches.....	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{5}{64}$	$\frac{3}{32}$
Per foot (see Special Notice).....	.08	.10	.15	.17	.25	.42

11596. RUBBER TUBING, Black, pure gum, heavy wall, same quality as No. 11594.

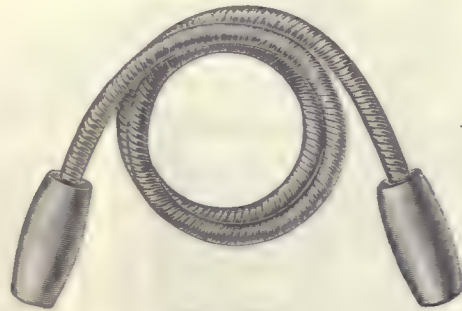
Diameter inside, inches.....	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{5}{64}$	$\frac{5}{64}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{7}{64}$	$\frac{1}{8}$
Per foot (see Special Notice).....	.15	.17	.22	.27	.42	.60

11600. RUBBER TUBING, Labruco, Black, light wall, pure gum, free from blooming, very elastic and impervious to gases. It clings to glass tubing, eliminating wiring. Especially suitable for connections to gas analysis apparatus. Each length bears the trade-mark Labruco repeated frequently.

Diameter inside, inches.....	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Thickness of wall, inches.....	$\frac{1}{32}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Per foot (see Special Notice)...	.06	.09	.12	.18	.24	.35	.50	.80	.90	1.15
Per 12-foot length.....	.60	.90	1.20	1.80	2.40	3.90	5.25	....	....	....



Nos. 11600-4.



No. 11624.



No. 11626.



No. 11630.

11602. RUBBER TUBING, Labruco, Black, heavy wall, same quality as No. 11600.

Diameter inside, inches.....	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$
Thickness of wall, inches.....	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{3}{32}$
Per foot (see Special Notice).....	\$0.10	.12	.15	.28	.36
Per 12-foot length.....	1.05	1.25	1.50	2.70	3.60

11604. RUBBER TUBING, Labruco, Red, light wall, same as No. 11600, except for the color.

Diameter inside, inches.....	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Thickness of wall, inches.....	$\frac{1}{32}$	$\frac{3}{64}$	$\frac{3}{64}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
Per foot (see Special Notice)...	.06	.09	.12	.18	.24	.35	.50	.80	.90	1.15
Per 12-foot length.....	.60	.90	1.20	1.80	2.40	3.90	5.25	.....	.....	.....

11610. RUBBER TUBING, Pressure, Black, semi-pure gum, extra heavy wall, for filter and air pump connections, vacuum work, etc. Because of its flexibility this tubing is also useful for connections to mercury leveling bulbs, nitrometers, etc.

Diameter inside, inches.....	$\frac{3}{16}$	$\frac{1}{4}$
Thickness of wall, inches.....	$\frac{3}{16}$	$\frac{3}{16}$
Per foot (see Special Notice).....	.50	.60

11614. RUBBER TUBING, Pressure, cloth insertion, heavy wall, for air pump connections, etc.

Diameter inside, inches.....	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$
Per foot (see Special Notice).....	.12	.15	.16	.18	.22

11618. RUBBER TUBING for Gooch Crucibles, thin walled band tubing, pure gum, very elastic.

Width outside when flat, inches.....	$1\frac{1}{2}$	$1\frac{3}{4}$	2 $\frac{1}{8}$
Width inside when flat, inches.....	$1\frac{3}{4}$	$1\frac{5}{8}$	2
Per foot.....	.25	.30	.40

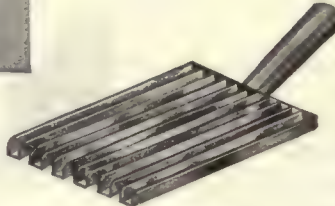
11624. TUBING, Flexible, Steel, with rubber packing, for connections to Bunsen burners, hot plates, etc. It is indestructible except by acids and excess of oil, is gas tight and safe from kinking or breaking. Each length is furnished with heavy rubber socket at each end. Inside diameter, $\frac{1}{4}$ inch.

Length, inches.....	24	36
Each.....	.25	.35

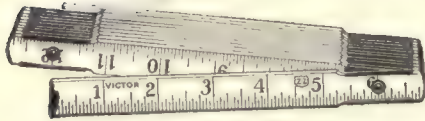
11626. TUBING, Flexible, Steel, made entirely of metal by a new process, without rubber or other packing. It is gas tight and indestructible, except by strong acids, and will last indefinitely. Inside diameter, $\frac{1}{4}$ inch.....per foot .30**11627. RUBBER CONNECTORS for use with No. 11626.....per pair .10****11630. RUBBER TUBE and Bulb Expander, for stretching tubing and bulbs to facilitate attaching to connection tubes, pipettes, etc..... .50**



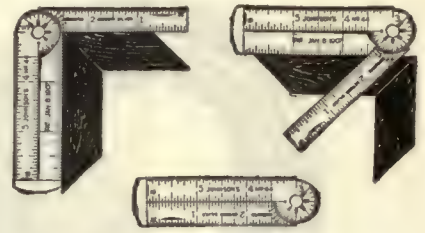
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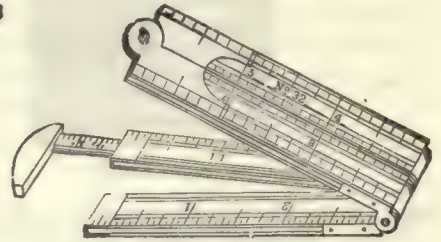
No. 11796.



No. 11642.



No. 11646 (five positions).



No. 11640.

- F661. **RULE, Celluloid**, metric and English, 6 inches long. Of white celluloid with one edge graduated in mm, other edge in eighths of inches. The two scales are numbered from the same end of the rule, making easy a comparison of measurements in the two systems. This scale may easily be carried in the vest pocket. Each .05
Per hundred 4.50

11640. **RULE, English and Metric**, boxwood, 12 inches by 16ths on one side, millimeters on the other. Four fold, solid brass joints, with brass caliper extension for measuring diameters up to $2\frac{3}{4}$ inches or 70 mm. Made to carry in pocket. \$0.65

11642. **RULE, English and Metric**, light boxwood, 36 inches by 16ths on one side, millimeters on the other. Six fold, spring joints, very convenient for comparing English and metric measurements. Made to carry in pocket.50

11646. **RULE, Johnson's Patent Combination**. This six-inch folding pocket rule is made of spring German silver accurately and distinctly graduated; it can be used as a Hook-rule, Caliper-gauge, Protractor, Triangle or Try-square. The upper edge is graduated in 32nds, the lower edge in 16ths. The caliper blade is graduated in 16ths on one side and 32nds on the other. The protractor is graduated every five degrees and is provided with a vernier reading to $\frac{1}{2}$ degree. This handy and indispensable rule can be set to any desired angle, and the center joint is so constructed that the rule remains firm wherever set 2.50

RULES, Metric, see Scales.

RULE, Parallel, see Drawing Instruments.

RULES, Slide, see Slide Rules.

- F845. **RUPERT'S DROPS** per dozen .50

SAMPLE BAGS, see Paper Bags.

SAMPLE BOTTLES, see Bottles.

SAMPLE BOXES, see Boxes.

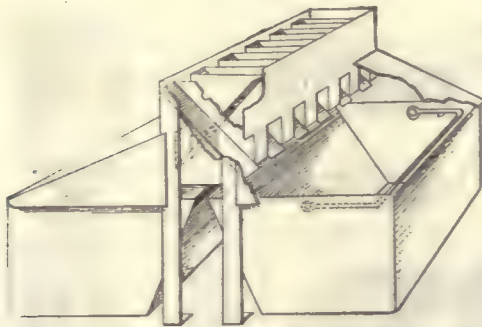
SAMPLE JARS, see Jars.

11796. **SAMPLERS, Hand, for Coal and Ore**, consisting of sampler of tin with handle, divided into parallel troughs, and a scoop of sheet iron with band-iron handle.

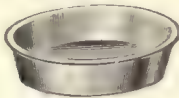
No.	A	B	C	D
Dimensions, inches	6x8½	7x9	10x10	11x12
Width of troughs, inches.	½	¼	½	¾
Number of troughs.	6	14	10	8
Each	2.25	3.70	3.80	4.15

11800. **SAMPLERS, Jones**, for quick and uniform sampling of ores, cement, coal, etc.; easily cleaned. Complete with hopper mounted on support, 4 sampling pans, brush and scoop.

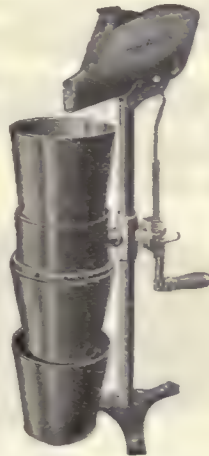
No.	A	B
Size, inches	6x6	10x10
Width of troughs, inches.	½	¾
Number of troughs.	8	10
Each	11.00	19.80



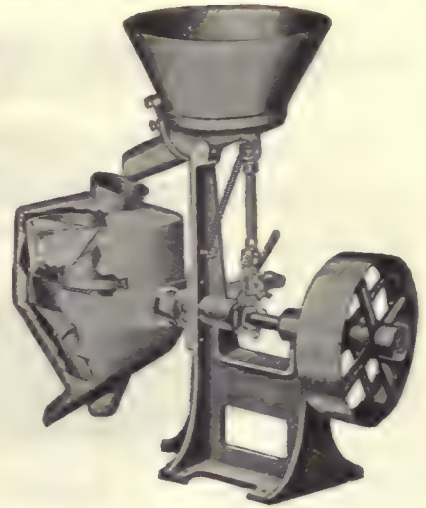
Nos. 11802-4.



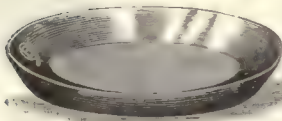
No. 11822.



No. 11808.



No. 11812.



No. 11830.



No. 11832.

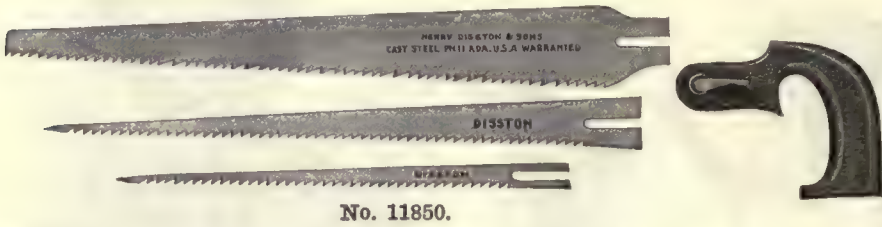
11802. **SAMPLER, Riffle**, for reducing quantity of 4-mesh coal samples, according to specifications of the United States Bureau of Mines and the American Society for Testing Materials. With twelve divisions, each $\frac{5}{8}$ -inch wide. Complete with four sampling pans, scoop and brush. (See Journal of Industrial and Engineering Chemistry, Vol IX, No. 1, for January 1917) \$16.00
11804. **SAMPLER, Riffle**, for reducing the 20 and 60-mesh coal to a laboratory sample. Similar to No. 11802, but with twelve divisions each $\frac{3}{8}$ inch wide. Complete with four sample pans, scoop and brush 22.00
11808. **SAMPLER, Braun Umpire Ore**, for hand power, for accurate and impartial sampling. Consists of a hopper mounted on a support; two buckets, each divided into four parts, two open and two closed; and a receiver. By means of gears attached to the handle the buckets are made to revolve in opposite directions; with the same motion the hopper is agitated by means of a cam and coiled spring. The sample is halved in the upper bucket and again in the lower, allowing one quarter of the original to fall into the receptacle. Refeeding the quarter obtained gives $\frac{1}{4}$ th; and by a second refeeding $\frac{1}{16}$ th of the original sample is obtained. All parts are removable and easily accessible for cleaning. Width of sampler, 10 inches; length, 21 inches; height, 41 inches; shipping weight, 125 pounds..... 43.50
11810. **SAMPLER, Braun Umpire Ore**, for power, with tight and loose pulleys..... 54.00
11812. **SAMPLER, Braun Universal**, with tight and loose pulleys for power. Consists of two separators, which revolve in opposite directions, each divided into four parts. By this means, the original sample is quartered in the upper separator, half going into the discard and half into the lower separator, where the process is repeated, allowing one quarter of the original sample to fall into the receptacle, the rest going into the discharge chute. The hopper is mechanically agitated by means of a cam, and is fitted with a gate to control the flow. The entire machine is enclosed in a sheet iron shell and is practically dust-proof. Easily and quickly cleaned, an air blast being the most convenient method. Length over all, 32 inches; width, 14 inches; height, 35 inches; size of pulleys, 12x2 inches; shipping weight, 220 pounds 106.00
11818. **SAMPLING CLOTH**, heavy duck oil cloth, black, for mixing coal samples, according to the method described in Standard D21-16 of the American Society for Testing Materials. Size, 6x8 feet 7.00
11822. **SAMPLING PANS**, of seamless tin-plate, for ore.

Diameter, inches.....	5	6	7	8½	10
Each .....	.07	.09	.12	.16	.22

SAND, see Sea Sand.

SAND, Standard for Cement, see Cement Testing Apparatus.

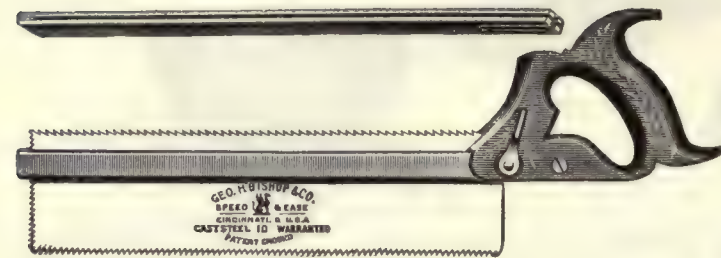
11830. **SAND BATHS**, cold rolled steel, shallow form.
- | | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Diameter, inches..... | 3 | 4 | 5 | 6 | 8 | 10 |
| Each | .08 | .10 | .12 | .16 | .30 | .60 |
11832. **SAND BATHS**, cold rolled steel, hemispherical form.
- | | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Diameter, inches..... | 3 | 4 | 5 | 6 | 8 | 10 |
| Each | .10 | .14 | .20 | .25 | .40 | .60 |



No. 11850.



No. 11852.



No. 11854.



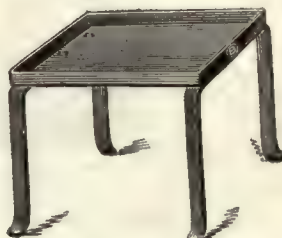
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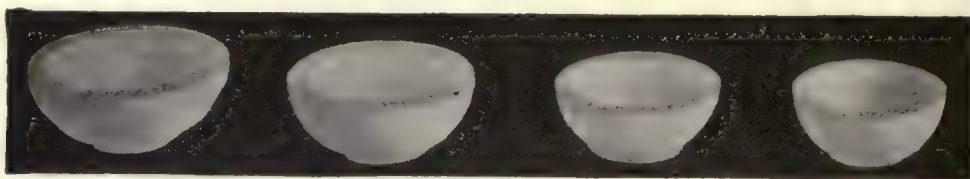


No. 11834.

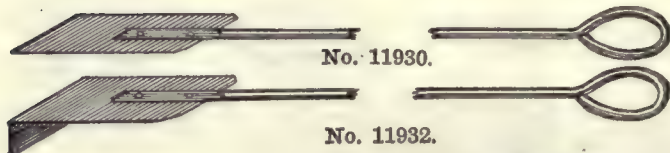
11834.	SAND BATH, Hot Plate, a Russia iron tray, 8x10 inches, on legs.....	\$2.25
11840.	SAND GLASSES, improved construction with metal bases.	
	For, minutes	1 2 3 5 10
	Each .....	.75 .75 .90 1.10 1.50
	SAND PAPER, see Paper.	
11850.	SAW, Combination. Wood handle, with polished brass adjusting lever and set of three interchangeable blades, including a 10-inch keyhole blade and a 14-inch compass blade.....	1.40
11852.	SAWS, Crosscut, good grade steel, filed ready for use.	
	Length, inches	20 26
	Each	1.40 1.80
11854.	SAW, Dovetailing and Depth Cutting, one side for cross, the other for rip sawing. The back of this saw constitutes a slot through which the blade slides, enabling the workman to move, space and adjust it to any desired width or distance from edge of back, so as to cut exactly any desired depth. Length of blade, 18 inches.....	2.65
11856.	SAW, Hack, for cutting metals. Solid steel frame, natural finish, enamel handle; blade can be faced four ways. With one blade.....	.70
11858.	SAW, Hack, of steel, white nickel-plated, except the handle. Adjustable for 8 to 12-inch blades; blades can be faced four ways. With one blade	1.75
11859.	HACK SAW BLADES, high grade steel.	
	Length, inches	8 12
	Per dozen	1.00 1.30
	SAW, Keyhole, see No. 11850 Combination Saw.	
	SAWS, Pruning, send for Catalog A of Agricultural Apparatus.	
11864.	SAW, Rip, good grade steel, filed ready for use; length 28 inches.....	2.00



- No. 11882.**
- No. 11904.**
- No. 11916.**
- No. 11908.**
- No. 11912.**
- No. 11918.**
- No. 11896.**
- No. F727.**
- No. F729.**
11870. **SCALE, Paper, metric**, printed on heavy bond paper, 3.5x23.5 cm; 20 cm along one edge is graduated in mm divisions. **Per dozen** \$0.10
Per hundred .75
11871. **SCALE, Paper, metric.** 1 meter long, graduated in millimeters. For use vertically; zero at the top **Each** .06
Per dozen .54
11872. **SCALE, Paper, metric.** Same as No. 11871, but with zero at the bottom. **Each** .06
Per dozen .54
11874. **SCALE (METER STICK), Maple**, 2 cm square. One face is plain and shows the length of the simple meter; the second face is graduated in tenths of meters, or decimeters; the third face is graduated in hundredths of meters, or centimeters; and the fourth face is graduated in thousandths of meters, or millimeters. The last named face gives divisions also in decimeters and centimeters. This piece is valuable in teaching students the metric system of lengths.67
11876. **SCALE (METER STICK), Boxwood.** A high-grade stick graduated in millimeters on both edges of one face; other face blank.60
11878. **SCALE (METER STICK), Boxwood.** Same as No. 11876, but graduated in millimeters and inches70
11882. **SCALE (METER STICK), Maple.** Both edges of one face are graduated in decimeters, centimeters and millimeters; one edge of the other face in inches and eighths.25
11884. **SCALE (HALF-METER STICK), Maple.** Same graduation as No. 11882.20
11888. **SCALE (METER STICK), Maple.** Same as No. 11882, but ends tipped with brass.40
11890. **SCALE (HALF-METER STICK), Maple.** Same as No. 11884, but ends tipped with brass30
11892. **SCALE (DOUBLE-METER STICK), Maple,** ends tipped with brass. Same as No. 11888, but two meters long.1.00
- F727. **SCALE (RULE), Maple, metric and English**, 12 inches long, one face graduated on one edge in millimeters and on the other in inches and 16ths. Double bevelled with protractor (5 degree divisions) on back. **Each** .04
Per dozen .40
- F729. **SCALE (RULE), Boxwood, metric and English**, 12 inches long. One edge bevelled and accurately graduated in millimeters, the other face graduated in inches and 16ths. **Each** .10
Per dozen 1.05
11896. **SCALE, Tap Drill**, to determine the proper drill to use preceding the use of a machine screw tap of any size. On one side is a list of machine screw tap sizes followed by lists of the tap drill size numbers, their decimal equivalents, the corresponding body drill size numbers and their decimal equivalents. On the reverse side of the scale is a table of decimal equivalents of ordinary fractions by 64ths up to $\frac{63}{64}$ ths. At the lower end is an inch scale graduated to 64ths. Made of flexible spring steel $1\frac{1}{16}$ inches wide and $6\frac{3}{4}$ inches long.50
- SCISSORS, see Shears.**
- SCLEROSCOPE, see Hardness Testers.**
11904. **SCOOP, Agateware**, 3x5 $\frac{1}{2}$ inches, with handle20
11908. **SCOOPS, Horn, flat and wide, with square ends, for ordinary use.**
- | | | | | |
|-----------------------|-----|-----|-----|-----|
| Length, cm. | 10 | 12 | 14 | 16 |
| Each | .15 | .18 | .21 | .27 |
11912. **SCOOP, Iron**, adopted by the Cleveland Iron Chemists as standard for sampling iron ores. Length, 3 $\frac{1}{4}$ inches; width, 2 $\frac{1}{4}$ inches; depth, 1 $\frac{1}{4}$ inches; with 6 $\frac{3}{4}$ inch handle.50
11916. **SCOOP, Sampling**, of heavy iron with wood handle, 5x4 $\frac{1}{2}$ inches.40
11918. **SCOOP, Tin Plate**, with handle, for mixing. Length of bowl, 8 inches; width, 5 $\frac{1}{2}$ inches . . .45
- SCOOPS, Weighing, see Balance Accessories.**



No. 11924.

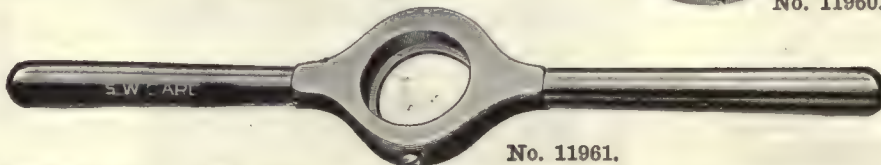


No. 11930.

No. 11932.



No. 11960.



No. 11961.

11924. SCORIFIERS, Denver Fire Clay.

Diameter, inches.....	2	2¼	2½	2¾
Number in original barrel.....	2000	2000	1750	1000
Per 100	\$2.80	3.00	3.50	4.25
Per 100 in original barrel.....	2.05	2.25	2.60	3.15

SCORIFIER TONGS, see Tongs.

11930. SCRAPER , for cleaning muffles, flat end, length 36 inches.....	.50
11932. SCRAPER , same as No. 11930, but with end bent .....	.50

SCREWS, Machine, Iron, Flat Head. In gross packages only.

Length, inches ...	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4	5	6	8	10
11940A. No. 2, per gross... \$0.30	.30	.30	.30	.30	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85
11940B. No. 4, per gross...	.30	.30	.30	.30	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85
11940C. No. 6, per gross...	.35	.35	.35	.35	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90
11940D. No. 8, per gross...	.35	.35	.40	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00
11940E. No. 10, per gross...	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30

11942A-E. SCREWS, Machine, Iron, Round Head. Same sizes and prices as No. 11940. In gross packages only.**SCREWS, Machine, Brass, Flat Head. In gross packages only.**

Length, inches ...	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4	5	6	8	10
11944A. No. 2, per gross...	.60	.60	.60	.65	.75	.85	1.05	1.35	1.50	1.65	1.85	2.05	2.25	2.45	2.65	2.85
11944B. No. 4, per gross...	.65	.65	.70	.75	.80	.90	1.05	1.35	1.50	1.65	1.85	2.05	2.25	2.45	2.65	2.85
11944C. No. 6, per gross...	.85	.85	.90	.95	1.05	1.20	1.35	1.50	1.65	1.85	2.05	2.25	2.45	2.65	2.85	3.05
11944D. No. 8, per gross...	1.25	1.25	1.35	1.50	1.65	1.80	2.00	2.15	2.35	2.55	2.75	2.95	3.15	3.35	3.55	3.75
11944E. No. 10, per gross...	1.80	1.80	1.90	2.00	2.25	2.60	3.00	3.35	3.70	4.05	4.40	4.75	5.10	5.45	5.80	6.15

11946A-E. SCREWS, Machine, Brass, Round Head. Same sizes and prices as No. 11944. In gross packages only.**SCREWS, Wood, Iron, Flat Head. In gross packages only.**

Length, inches	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4	5	6	8	10
11950A. No. 2, per gross.....	.50	.50	.50	.50	.50	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55
11950B. No. 4, per gross.....	.50	.50	.50	.50	.50	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55
11950C. No. 6, per gross.....	.50	.50	.50	.50	.50	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55
11950D. No. 8, per gross.....	.60	.60	.60	.60	.60	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65	.65
11950E. No. 10, per gross.....	.70	.70	.70	.70	.70	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75

11952A-E. SCREWS, Wood, Iron, Round Head. Same sizes as No. 11950. Prices 0.10 per gross greater. In gross packages only.**SCREWS, Wood, Brass, Flat Head. In gross packages only.**

Length, inches	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4	5	6	8	10
11954A. No. 2, per gross.....	1.20	1.25	1.30	1.45	1.85	2.25	2.65	3.05	3.45	3.85	4.25	4.65	5.05	5.45	5.85	6.25
11954B. No. 4, per gross.....	1.35	1.40	1.50	1.65	2.00	2.35	2.75	3.15	3.55	3.95	4.35	4.75	5.15	5.55	5.95	6.35
11954C. No. 6, per gross.....	1.55	1.70	1.80	2.00	2.15	2.35	2.55	2.75	2.95	3.15	3.35	3.55	3.75	3.95	4.15	4.35
11954D. No. 8, per gross.....	1.95	2.15	2.40	2.60	2.85	3.15	3.45	3.75	4.05	4.35	4.65	4.95	5.25	5.55	5.85	6.15
11954E. No. 10, per gross.....	2.80	3.15	3.45	3.75	4.05	4.35	4.65	4.95	5.25	5.55	5.85	6.15	6.45	6.75	7.05	7.35

11956A-E. SCREWS, Wood, Brass, Round Head. Same sizes and prices as No. 11954. In gross packages only.

11960. SCREW DIES , round, adjustable, 5/8 inch diameter, ¼ inch thick.																
No.	A	B	C	D	E	F	G	H	J							
Screw gauge No....	2	4	6	6	8	8	10	12	14							
Approx. diam., in...	5/64	7/64	9/64	5/32	5/32	5/32	3/16	7/32	1/4							
No. threads to inch..	56	36	32	40	32	40	32	24	20							
Each .....	.95	.80	.60	.30	.60	.60	.60	.60	.60							

11961. SCREW DIE STOCK, for holding No. 11960 Dies



No. 11970.



No. 11978.



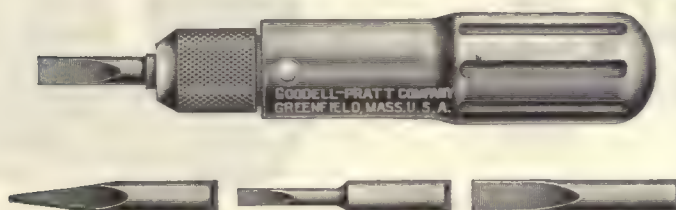
No. 11982.



No. 11980.



No. 11984.



No. 11988.



No. 11994.

11964. **SCREW DIES**, round, adjustable.

No.	A	B	C	D
Diameter of die, inches.....	1	1	1 $\frac{1}{16}$	2 $\frac{1}{4}$
Diameter of screw, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
No. threads to inch.....	20	16	12	10
Each	\$1.10	1.10	1.50	3.00

11965. **SCREW DIE STOCK**, for holding No. 11964 Dies.

No.	A	B	C
For die of diameter, inches.....	1	1 $\frac{1}{16}$	2 $\frac{1}{4}$
Each	1.80	3.70	4.00

11968. **SCREW DIE AND TAP SET**, with stock 7 inches long, tap wrench 7 $\frac{1}{2}$ inches long, 6 dies 1 $\frac{1}{16}$ inch diameter and 6 taps cutting threads 4-36, 6-32, 8-32, 10-24, 12-24 and 14-20. Set is enclosed in neat hardwood case..... 8.0011970. **SCREW DIE AND TAP SET**, with stock 9 inches long, 5 dies 1 inch in diameter, and 5 taps cutting threads $\frac{1}{4}$ -20, $\frac{5}{16}$ -18, $\frac{3}{8}$ -16, $\frac{7}{16}$ -14 and $\frac{1}{2}$ -12. Set is enclosed in neat hardwood case..... 12.5011978. **SCREW DRIVERS**, with steel blade in wooden handle.

Length, inches	4	8
Each .....	.20	.35

11980. **SCREW DRIVER**, rosewood handle and finest steel blade, elegantly polished throughout. Especially adapted for instrument use. Indispensable to the laboratory. Length over all, 5 $\frac{1}{2}$ inches; length of blade, 2 inches; width of blade, $\frac{1}{8}$ inch..... .4011982. **SCREW DRIVER, Jewelers'**, of steel, nickel-plated, with blade $\frac{1}{16}$ inch in width. Length over all, 3 $\frac{1}{4}$ inches

11984. **SCREW DRIVER, Ratchet**, a high grade tool. Blade and ratchet mechanism made of oil tempered tool steel; changes from right to left are made by turning the knurled ferrule. Length of blade, 6 inches; width of blade, $\frac{1}{4}$ inch..... 1.10

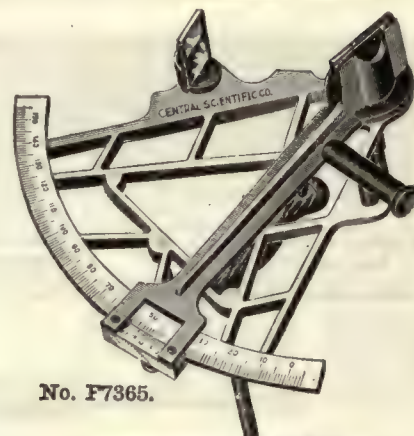
11988. **SCREW DRIVER POCKET SET**, with 3 blades of assorted sizes and 1 reamer for making or enlarging holes. When not in use the blades are kept in the hollow handle. 3 $\frac{1}{4}$ inches long when closed; polished and nickel-plated..... .90

11994. **SCREW EYES**, of bright wire.

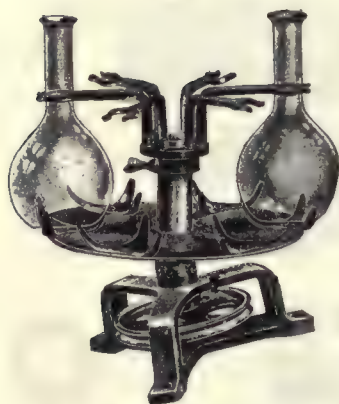
No.	214	12	7
Length, approx., inches.....	$\frac{3}{4}$	1	1 $\frac{1}{2}$
Per dozen05	.07	.12



No. 11996.



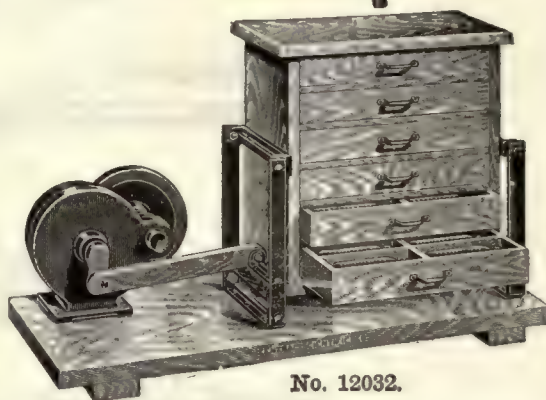
No. F7365.



No. 12026.



No. 12000. No. 12001,



No. 12032.

11996. SCREW HOOKS, of bright wire.

No.	14	12	10	8
Length over all, approx., inches.....	1 1/4	1 1/2	2	2 1/4
Per dozen	\$0.06	.08	.09	.12

SCREW PITCH GAGE, see No. 6486.**12000. SCREW TAPS, standard.**

No.	A	B	C	D	E	F	G	H	J
Screw gage No.....	2	4	6	6	8	8	10	12	14
Approx. diam., inches.....	$\frac{5}{64}$	$\frac{7}{64}$	$\frac{9}{64}$	$\frac{9}{64}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$
No. threads to inch.....	56	36	32	40	32	40	32	24	20
Each .....	.44	.30	.26	.26	.26	.26	.26	.26	.45
No.					K	L	M	N	
Diameter, inches					$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	
No. threads to inch.....					20	16	12	10	
Each .....					.45	.55	.70	1.20	

12001. SCREW TAP WRENCH, for taps 1/4-inch and smaller

1.50

12002. SCREW TAP WRENCH, for taps 1/4 to 3/4-inch

2.00

12010. SEA SAND for cleaning platinum ware..... per pound

.10

SEALING WAX, see Wax, Sealing.**SELENIUM CELLS, see Catalog F of Physical Apparatus.****F7365. SEXTANT, Metal Model, full size, with which quite accurate work is possible. The main scale is graduated in 20 minute divisions and may be read to 30 seconds by means of the vernier on the index arm. Complete with mirrors, mirror mountings, sight tube, handle and legs for support**

22.50

SHAKING APPARATUS**12026. SHAKING APPARATUS, Camp's (Patented), used extensively by the United States Steel Corporation and other steel and iron laboratories for the rapid precipitation of phosphorus by the molybdic acid method, and for dissolving steel or pig iron for carbon combustion. The disk is made to hold six flasks, Erlenmeyer or Florence shape, from 6 to 24 ounces capacity. Power required to operate, about 1/25 h. p.; diameter of pulley, 6 inches; proper speed of operation, 100 to 140 r. p. m.....**

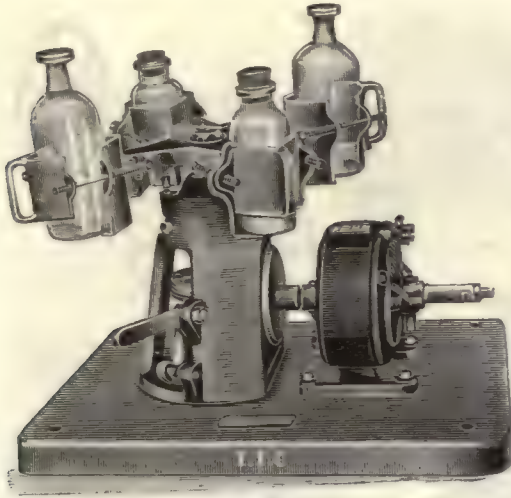
27.50

12028. SHAKING APPARATUS, Camp's, same as No. 12026, but with wooden disk and clamps for twelve volumetric flasks of 100 cc capacity. Widely used in sugar analysis.....

35.00

12032. SHAKING APPARATUS, Chest of Drawers Design, with polished hardwood chest containing six drawers, with a capacity of eight 250 cc bottles each. Requires 1/4 h. p. motor to operate. Complete on hardwood base with enclosed gear but without motor.....

75.00



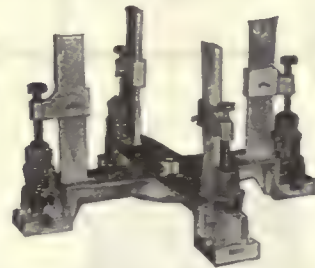
No. 12038.



No. 12048.



No. 12040.



No. 12049.

12038. SHAKING APPARATUS, Electric, for four bottles. Constructed of heavy cast iron making it strong and rigid, with ball bearings affording smoothness of motion. The clamps will take ordinary bottles from 200 to 1000 cc, and by means of blocks, smaller bottles and tubes may be held. The speed may be varied according to the load; for four 100 cc bottles, 300 r. p. m. should be used; for small bottles about 600 r. p. m.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	\$134.40	134.40	129.60	129.60

12040. SHAKING APPARATUS, Electric, similar to No. 12038, but for two bottles or tubes up to 50 cc capacity. Especially suited for sputum work. The speed is about 1000 r. p. m., subjecting the bottle contents to very vigorous shaking.

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	84.00	84.00	78.00	78.00

12041. HEAD for No. 12040, to take two Erlenmeyer flasks of 150 cc capacity..... 14.40

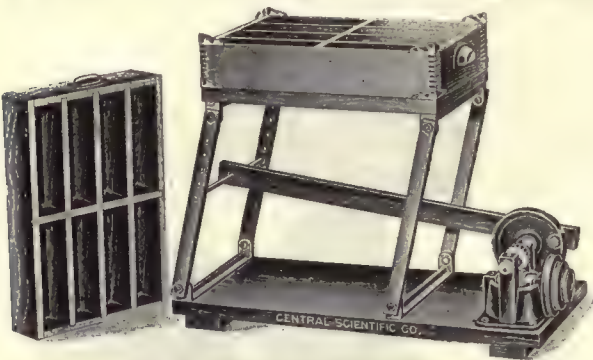
12042. HEAD for No. 12040, to take four 50 cc bottles or tubes, at a maximum speed of about 800 r. p. m. 28.80

12048. SHAKING APPARATUS, Electric, Rickard's, for Sputum Bottles, very convenient for laboratories examining many samples each day, as in Boards of Health. Arranged for shaking samples in the original collection bottles, thus obviating danger of confusion or contamination. If it is considered desirable to centrifuge the sputum in the same bottle, this may be done by using No. 2735 Sputum Bottle Carrier with Heads Nos. 2681 or 2685 and Centrifuges Nos. 2670 or 2696. With variable speed control for motor. Maximum speed with 24 bottles, about 600 r. p. m. Without bottles.

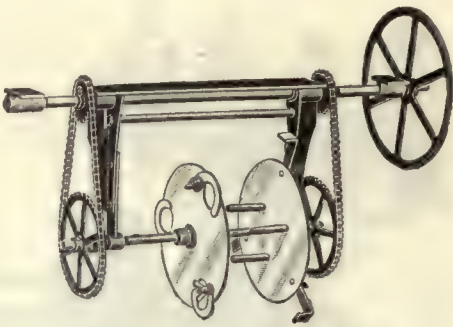
No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	134.40	134.40	129.60	129.60

SPUTUM BOTTLES for No. 12048, see No. 2757.

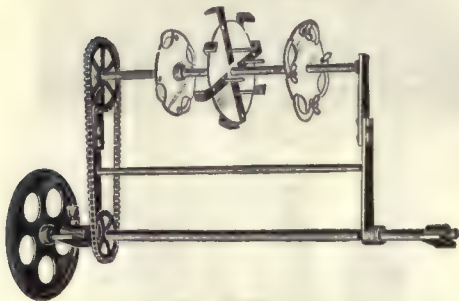
12049 HEAD for No. 12048 to take four bottles up to 1000 cc, for use in place of 24 sputum bottle head 57.60



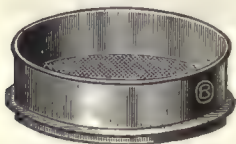
No. 12060.



No. 12066.



No. 12070.



Nos. 12084-5.



Nos. 12086-7.



No. 12078.



No. 12076.

12054. **SHAKING APPARATUS, Horizontal Form**, for single bottles up to five gallons capacity. With speed reducing gear from which three speeds may be obtained. Can be operated by $\frac{1}{8}$ h. p. motor. Without motor..... \$47.50
12056. **SHAKING APPARATUS, Horizontal Form**, same as No. 12054, but for two bottles up to five liters capacity..... 48.00
12058. **SHAKING APPARATUS, Horizontal Form**, same as No. 12054, but for four bottles up to two liters capacity..... 50.00
12060. **SHAKING APPARATUS, Horizontal Form**, same as No. 12054, but with two hardwood trays, with a capacity of eight 250 cc bottles each..... 52.50
12066. **SHAKING APPARATUS, Kent Laboratory Type**, for 3 bottles up to 2000 cc..... 60.00
12070. **SHAKING APPARATUS, Massachusetts Institute of Technology Form**, for eight 250 cc bottles. Especially adapted for use in solubility determinations, conductivity work, etc..... 50.00
12076. **SHEARS, Paper, high grade steel.**
Length of blades, inches..... 6 8
Each 1.40 2.50
12078. **SHEARS, Tinnners' Snips**, for cutting metal. Length of cut, $2\frac{1}{2}$ inches..... .90
- SHEARS, Pruning**, see Catalog A of Agricultural Apparatus.

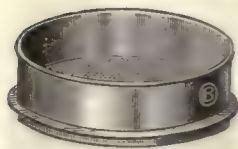
SIEVES

SIEVES, Brass Frame, seamless, brass gauze (for Covers and Bottom Pans see Nos. 12102 and 12104).

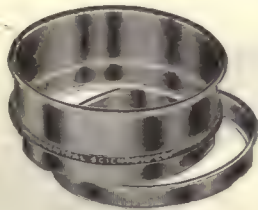
	Mesh	10	20	40	60	80	100	200
12084.	Each, 5 inches in diameter.....	1.25	1.25	1.40	1.45	1.50	1.90	3.20
12085.	Each, 8 inches in diameter.....	1.90	2.20	2.25	2.35	2.50	3.00	5.50

SIEVES, same as Nos. 12084 and 12085, in sets of five, one sieve fitting on top of another, with one cover and one bottom pan; set consists of 20, 40, 60, 80 and 100 mesh.

12086.	Per set, 5 inches in diameter.....	8.50
12087.	Per set, 8 inches in diameter.....	13.50



No. 12090.



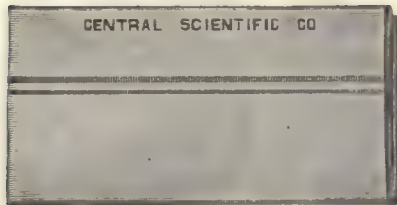
No. 12096.



No. 12102.



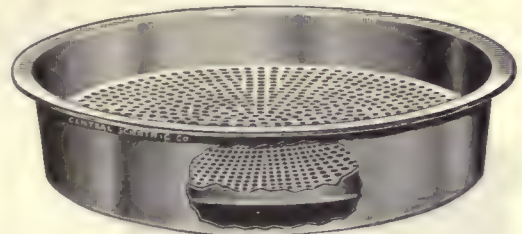
No. 12104.



No. 12098.



No. 12110.



No. 7398.

12090. **SIEVES, Brass Frame**, seamless, having sheet brass bottom with circular perforations. Extensively used in soil analysis and seed testing. Diameter, 5 inches.

Diameter of perforations, mm.....	1/2	1	2	3	5
Each	\$1.40	1.35	1.30	1.30	1.30

12091. **SIEVES**, complete set of five of No. 12090, with brass cover and bottom pan..... 8.50

12092. **SIEVES**, set same as No. 12091, with 3 mm and 5 mm sieves omitted..... 7.25
For Cover and Bottom Pans see Nos. 12102 and 12104.

12096. **SIEVE FRAME**, same as No. 12090 without bottom pan, but with brass ring for holding bolting cloth. Diameter, 5 inches..... 1.00

12098. **BOLTING CLOTH, Silk**, for making sieves, etc., of standard weight, 40 inches wide.

No.	2	5	7	9	11	13	15	18	20	25
Mesh per linear inch..	52	64	80	96	116	130	148	168	173	200
Per linear foot.....	2.40	2.80	3.00	3.20	3.80	4.60	5.40	7.20	10.00	11.00

12102. **COVERS** for Nos. 12084 to 12096.

Diameter, inches.....	5	8
Each .....	.50	.60

12104. **BOTTOM PANS** for Nos. 12084 to 12096.

Diameter, inches.....	5	8
Each .....	.50	.60

12110. **SIEVES, Bureau of Soils Type**, as employed in the Laboratories of the Bureau of Soils, Washington, D. C., for mechanical analysis. Set of four sieves turned from heavy brass castings with bottom pan and cover, each about 2 inches in diameter by 1 inch high, perfectly fitted, so that the set may be well shaken without coming apart. Shaped so that there is no loss of the sample, a great advantage where small samples are being tested. Sieves proper are readily replaceable; upper two of brass, with perforations 1 mm and 0.5 mm in diameter; lower two of bolting cloth 64 and 130 mesh.....per set 10.00

For Shaker for No. 12110 Sieves, see No. 12148.

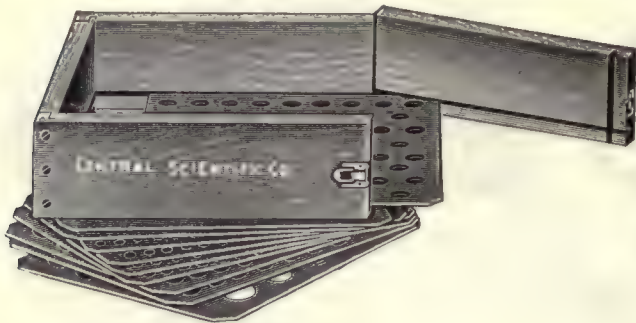
12114. **SIEVES, Cement, Bureau of Standards Type, Brass Frame**, seamless, of woven brass screen, 20 cm in diameter and 6 cm high, with certificate of the United States Bureau of Standards.

No.	A	B
Mesh	100	200
Size of openings, inches.....	0.0055	0.0029
Each	8.00	15.00

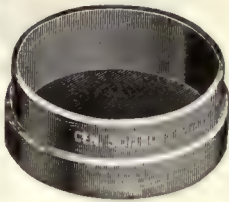
7398. **SIEVES, Corn Test**, according to specifications of the United States Department of Agriculture. The set consists of one sieve with 14/64 inch round holes, and one bottom pan, of aluminum, 13 inches in diameter by 3 inches deep..... 4.50

12120. **SIEVES, Sand, Bureau of Standards Type, Brass Frame**, seamless, of woven brass screen, 20 cm in diameter and 6 cm high, with certificate of the United States Bureau of Standards.

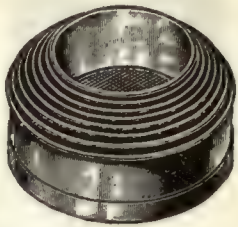
No.	A	B
Mesh	20	30
Size of openings, inches.....	0.0335	0.0223
Each	6.25	6.25



No. 12140.



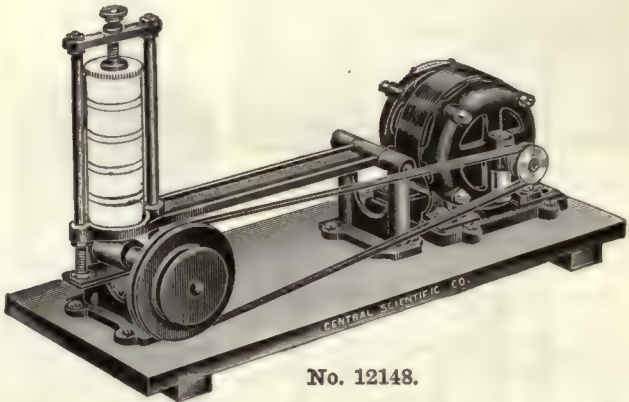
Nos. 12136-7.



No. 12128.



No. 7402.



No. 12148.

12124. **SIEVES, Standard, Brass Frame**, seamless, brass gauze, according to the specifications of the American Society for Testing Materials; diameter, 8 inches.

Mesh	10	20	30	40	50	60	70	80	90	100
Each	\$3.70	3.00	3.00	3.00	3.25	3.25	3.40	3.70	4.00	4.30
Mesh	110	120	130	140	150	160	170	180	190	200
Each	4.45	4.60	4.95	5.20	5.50	5.80	6.40	7.00	7.35	7.60

12125. **COVERS AND BOTTOM PANS** for No. 12124per set 2.00

12128. **SIEVES, Standard, Tin Frame**, seamless, brass gauze, similar to No. 12124, but nested in set of 8, from 5 to 8½ inches in diameter consisting of one each 10, 20, 30, 40, 50, 80, 100 and 200 mesh 24.00

7402. **SIEVES, Wheat Dockage**, according to Government specifications, a set of four sieves, 13 inches in diameter, and bottom pan, constructed of aluminum, telescoping. Consists of a buckwheat sieve with 8/64 inch triangular perforations; a fine seed sieve with 1/12 inch round perforations; a scalper sieve with 12/64 inch round perforations; and a chess sieve with perforations 4½/64 by ½ inch. (See Regulatory Announcement No. 2 of Federal Wheat Grades Effective July 1 and August 1, 1917)..... 8.00

SIEVES, Wood Frame, brass gauze.

Mesh	20	40	60	80	100	200
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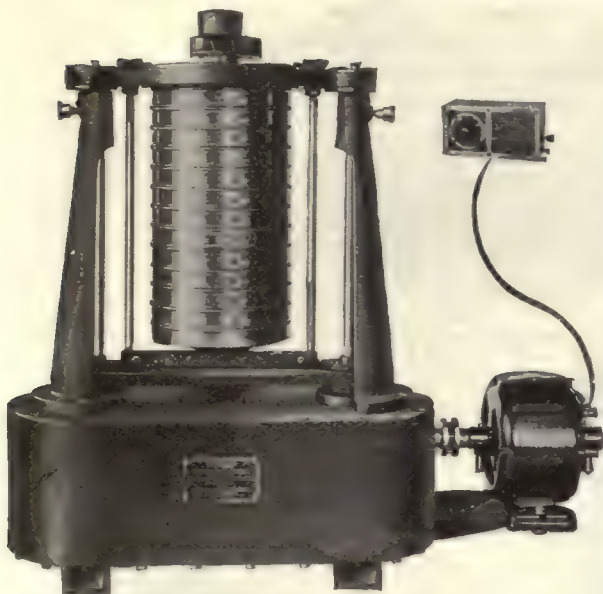
12136. **Each, 6 inches in diameter**..... .50 .60 .75 .90 1.10 3.20

12137. **Each, 8 inches in diameter**..... .60 .65 .80 1.00 1.25 3.50

12140. **SIEVES, Wood Frame**, consisting of a heavy wooden frame provided with a slot in which may be placed bottoms of perforated steel, and hinged at one end to facilitate removal and replacement of these metal bottoms. Inside dimensions of frame, 17½ x 14 x 5 inches. Ten bottoms are included with perforations of ⅛, ¼, ½, ¾, 1, 1¼, 1½, 2, 2½, and 3 inches..... 18.00

12148. **SIEVE SHAKER, for Power**, for use with No. 12110 Sieves. A motor of 1/20 h. p. is mounted on the same base with an eccentric shaft, to which it is belted. The set of sieves is clamped in a frame at the end of a long lever arm which rests on the eccentric. This lever arm is so attached to the eccentric that with each revolution of the cam the sieves are struck sharply, raised and dropped with a motion similar to that used in shaking by hand. Without sieves. (See Bulletin No. 84, United States Department of Agriculture, Bureau of Soils.)

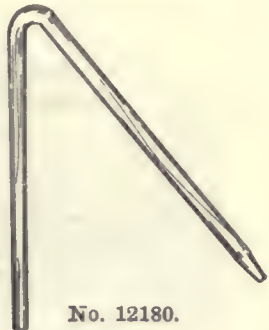
No.	A	B	C	D
	A.C.		D.C.	
For volts	110	220	110	220
Each	50.00	51.00	45.00	46.00



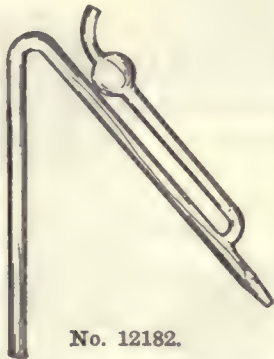
Nos. 12152-3.



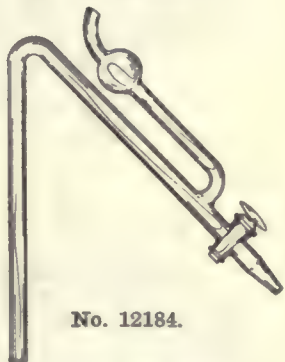
No. 12158.



No. 12180.



No. 12182.



No. 12184.

12152. **SIEVE SHAKER, Ro-Tap, Electrically Driven.** This machine reproduces the circular and tapping motions of hand sieving, with a uniform mechanical action, which produces reliable results and standardizes laboratory methods. Ruggedly constructed with heavy base and substantial supporting columns. Running parts operate in oil. By means of No. 12153 Stop-Rite Time Switch, the process may be made entirely automatic, as the switch may be set for any desired time interval, and the test will be automatically stopped at the end of that time. Capacity of the machine, 6 standard height 8 inch sieves with bottom pan, or 13 half standard height sieves with bottom pan. Complete with direct connected 110 volt motor, but without sieves or Stop-Rite Time Switch. No.

	A.C.		D.C.	
	110	220	110	220
For volts				
Each	\$200.00	205.00	200.00	200.00

12153. **STOP-RITE TIME SWITCH**, for use with No. 12152 Ro-Tap Sieve Shaker. May be set for any desired interval and will automatically stop machine at the end of the pre-determined period

12158. **SIFTER, Lightning No. 0**, for hand power. Complete with one sieve of any mesh up to 50 9.00 In ordering, kindly state mesh of sieve desired.

12166. **SILICA RODS, Opaque Fused Silica**, for use in stirring fusions and high temperature mixtures. In lengths up to 5 feet.

Diameter, mm.	1-2	3	4-5	6-7	8	9-10
Per foot.....	.50	.63	.94	1.25	1.56	1.75

SILICA TUBING, Opaque Fused Silica, glazed at the ends and smooth inside. Sizes up to 3/4 inch have satin finish. Very resistant to sudden changes of temperature. For combustion work, the glazed Combustion Tubing No. 3186 glazed inside and outside and gas tight should be selected. In lengths up to 8 feet.

In ordering specify diameter and thickness of wall.										
Diameter, inside, mm..	3	4-5	6-7	8	9-10	12-13	15-16	19	22	25
Thickness of wall, mm.	.5-2.5	.5-2	.5-2	.5-2	1-2	1-2	1-2.5	1-3	1-3	1-3

12168. Per foot.....

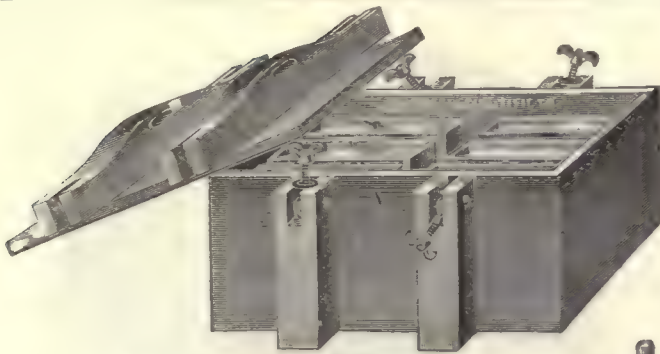
12169. For one end closed, per tube, add.....

12174. **SILK, Oiled**, in sheets 12x14 inches, each in a box.....Per sheet

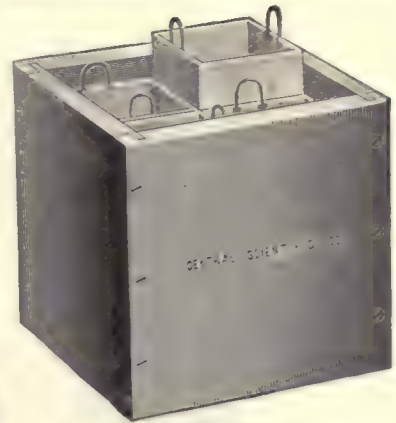
No.	A	B	C
Length of delivery tube, inches.....	12	18	24
Each .....	.40	.50	.60

No.	A	B	C
Length of delivery tube, inches.....	12	18	24
Each .....	.70	.80	.90

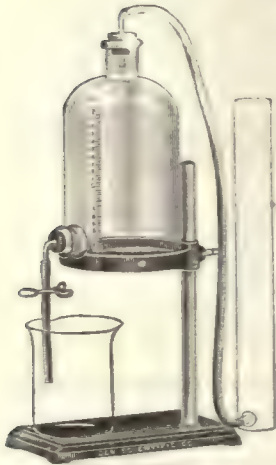
No.	A	B	C
Length of delivery tube, inches.....	12	18	24
Each	2.50	2.75	3.00



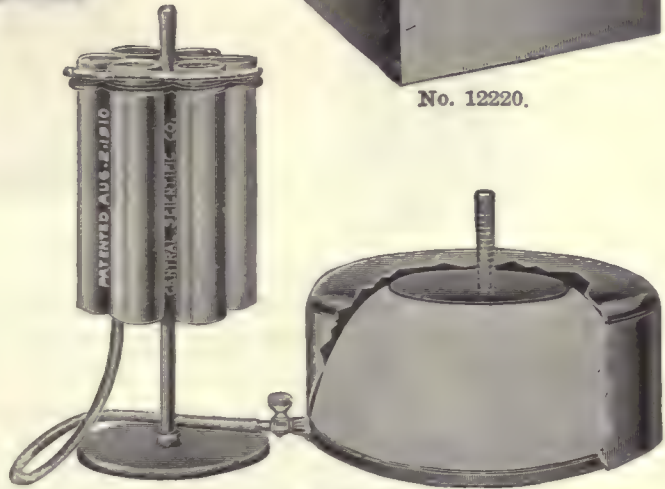
No. 12222.



No. 12220.



No. 12228.



No. 12234.

SOIL ANALYSIS APPARATUS

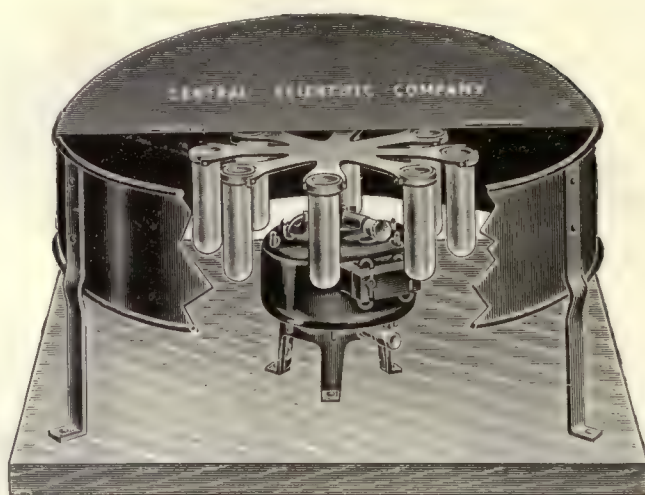
INCLUDING APPARATUS FOR PHYSICAL PROPERTIES OF SOILS

(Arranged Alphabetically.)

12220. **ABSORPTION APPARATUS, Heat**, for absorption of heat by soils, as described by Stevenson & Schaub. This apparatus is used to compare the temperatures of various soils at different depths when the soils are exposed to the direct rays of the sun, and consists of four zinc boxes 4x4x8 inches deep, enclosed in a wooden box open at the top..... \$5.00
12222. **ABSORPTION APPARATUS, Moisture**, for determining the power of dry soils to absorb hygroscopic moisture from a saturated atmosphere. A water-tight, water-proofed substantial wooden box with heavy cover so designed that it may be clamped air-tight to the box. (A metal box is not satisfactory, because it is so affected by temperature conditions that the results obtained have little or no value.) Wooden strips, not shown in the illustration, support the soil pans and have a device for holding the strips of absorption paper which by capillary action absorb water, keeping the air within the box in a saturated condition. Complete with six soil pans..... 17.50
12223. **SOIL PAN** of zinc, 6½x6½x1½ inches, as used in No. 12222 Absorption Apparatus. These pans are water-tight and will be found convenient for use in drying ovens. Each..... .30
12228. **ASPIRATOR, McCall**, for studying the rate of the flow of water through soils of different textures. This aspirator has no moving parts to cause errors from friction and the method of operation is exceedingly simple. The bottle is first filled with water to a definite mark on the scale and connections are made as shown in the illustration. The pinchcock is then opened and water allowed to run from the bottle until it stands at a much lower level. By noting the time required with different soils, the relative rate of flow is readily determined. Complete as illustrated, with metal support, but without soil tube or beaker..... 8.00
12229. **SUPPORT** only of No. 12228..... 3.00
12230. **ASPIRATOR BOTTLE** only of No. 12228. Complete with rubber stoppers, rubber tubing, and pinchcock 5.00
12234. **ASPIRATOR**, for determining the comparative porosity of soils by measuring the rate of flow of air through them under constant pressure. This apparatus consists essentially of a closed pressure chamber formed by a rubber diaphragm or bag placed between a movable weight and a wooden base 15 inches in diameter. To the weight is attached a graduated rod, by reference to which definite quantities of air may be forced through the different soils under consideration. The pressure chamber is enclosed in a suitable casing for protection.. 17.50



No. 12238.



No. 12242.

AUGERS, see Soil Sampling Apparatus.

BINS OR CONTAINERS for Soil, see general heading Bins or Containers.

12238. **BOTTLE**, Mechanical Analysis, convenient for separating soils into their constituent parts, as described in Mosier and Gustafson's "Soil Physics Laboratory Manual." Complete with inverted rubber stopper and tubes..... \$0.75

CARBONIC ACID APPARATUS, see general heading Carbon Dioxide Determination Apparatus.

12242. **CENTRIFUGE**, Soil, for preparing soil samples for Mechanical Analysis. This machine is of excellent design, having features suggested by agronomists. The motor is mounted with shaft vertical, thus obviating considerable vibration and allowing easy access to the soil tubes. A brass trunnion arm, mounted on this shaft, carries eight soil tubes, which are of heavy well annealed glass and are encased in aluminum sheaths. These sheaths are held in trunnions to the trunnion arm by hardened steel bearings. The whole is protected by a metal covering, which extends to the floor or table on which the motor rests, access to motor and tubes being gained by means of a hinged cover.

Complete with $\frac{1}{8}$ h. p. motor, of 1800 r. p. m. no load speed, ready for mounting on a table top, and eight soil tubes. No. A B C D

		A.C.		D.C.
For volts.....	110	220	110	220
Each	100.00	....	95.00	110.00

12243. **EXTRA SOIL TUBES**, heavy glass, as used in No. 12242.each .15
per dozen 1.50

12246. **CENTRIFUGES**, International, Electric, with equipment for mechanical analysis of soils, including speed control rheostat; No. 2685 Eight-tube Head; eight No. 2710 Metal Tubes, 100 cc, with No. 2711 Trunnion Rings; eight No. 2718 Rubber Cushions; 72 No. 2716 Plain Glass Tubes, 100 cc; and an 8-tube Rack. Dimensions: 23 inches high, closed; 35 inches high, open; and 24 inches in diameter, with a shipping weight of about 300 pounds.

No.	A	B	C	D
	A.C.		D.C.	
For volts ..	110	220	110	220
Each	138.00	138.00	108.00	108.00

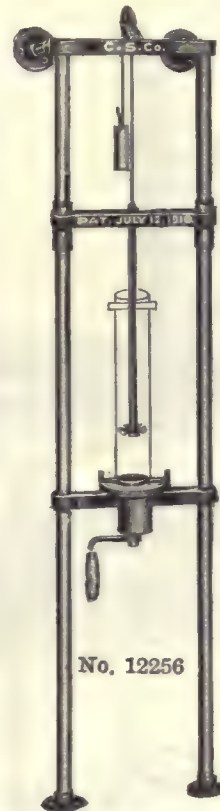
2716. **TUBES**, Glass, plain, lipped, 100 cc, for No. 12246 Centrifuge..per dozen \$2.30



No. 12246.



No. 12252.



No. 12256

12252. CENTRIFUGES, Moisture Equivalent, Briggs-McLane, as described in the Proceedings of the American Society of Agronomy, Volume 2, 1910.

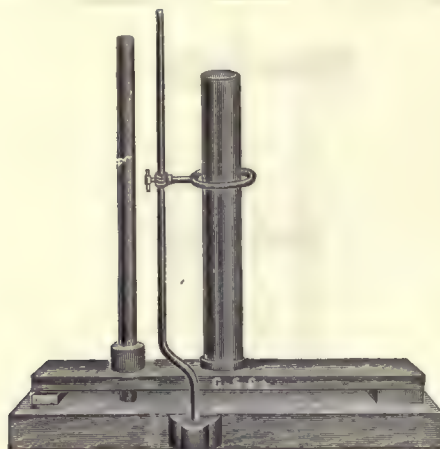
This centrifuge is used for determining the relative moisture equivalents of soils where the term moisture equivalent designates the maximum percentage of moisture which a soil can retain in opposition to a known centrifugal force. For a standard of comparison, a centrifugal force equal to 1,000 times the force of gravity has been adopted. In making the determinations, the soils, suitably moistened, are placed in cups with perforated bottoms. These cups are then placed in the cylinder of the centrifuge and rotated at a constant speed, so chosen as to develop the required centrifugal force. "Each soil now loses water until the capillary forces have increased sufficiently to balance the centrifugal force acting on the soil moisture. Since the moisture content of each soil which has been treated in this way is in capillary equilibrium with the same force, it follows that if these moist soils are placed in contact in any order whatever no movement of water from one soil to another will take place. A condition of complete equilibrium exists throughout the series of soils thus treated." It is then necessary only to determine the moisture content of each soil corresponding to this condition of equilibrium in order to determine its quantitative position in the scale of moisture retentiveness. The centrifuge here described is capable of maintaining the required centrifugal force well within the desired limit of accuracy.

The instrument consists of a bronze disk cylinder containing 16 soil boxes with wire gauze bottoms, and attached to the shaft of a vertically mounted D. C. motor. The motor is provided with a Kellogg Constant Speed Governor and a Frahm Tachometer (not shown in the illustration) is supplied which has a range from 2380 to 2500, thus bringing the desired point of speed, 2440 r. p. m., about the middle of the dial. If alternating current only is available, a motor-generator set should be used to produce the direct current necessary. See Nos. 4824 to 4848. Complete as described.

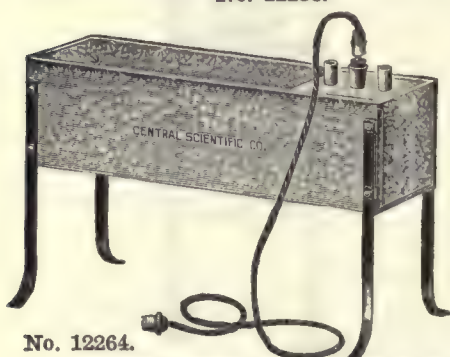
No.	A	B
For volts	110	220
Each	\$285.60	285.60

For other **CENTRIFUGES**, see general heading **Centrifuges**.
COLORIMETERS, see general heading **Colorimeters**.

12256. COMPACTING MACHINE, designed for obtaining uniform compaction of soils in tubes 18 inches or less in length and four inches or less in diameter. It consists of two uprights having sockets at their lower ends for attachment to the floor and a cross bar with wall attachments at their upper ends. A cross bar fastened rigidly to these uprights carries a rotating tube socket or holder which is rotated by means of a crank. Twice during each revolution the tube is raised to the height of $\frac{1}{4}$ inch by means of inclined surfaces under the tube holder, and automatically dropped, which process jars the soil into position. A small propeller is attached to the end of the rod extending down from the sliding cross bar. This pro-



No. 12258.



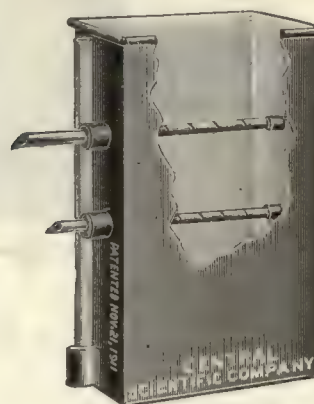
No. 12264.



No. 12262.



No. 12268.



No. 12272.

COMPACTING MACHINE, Continued.

pler is placed at the bottom of the tube to be filled and soil then poured into the tube. Twice during each revolution it drops with the soil tube, thus striking a definite number of blows on the soil column as it rises.

This compactor is built to compact soils to approximately the same condition in which they are found in the fields and to give uniform compaction for comparative tests. It is simple in principle and does its work quickly and easily. With two propellers (one for 2-inch tubes and the other for 4-inch tubes), weight holder, and weights..... **\$30.00**

12258. **COMPACTOR, Spring Board**, necessary for compacting soils in glass tubes. Base of wood 8x24 inches; spring board firmly fastened to base at one end; massive slip-weight slides on nickel-plated rod. A very substantial and well-finished piece **7.00**

12262. **CONDUCTIVITY APPARATUS**, for determining the thermal conductivity of soils. This design has been modified from the original design in use at the University of Illinois Soils Laboratory. A galvanized iron soil tray, 16x4x5 inches, has at one end a water-tight boiling tank, 4x4x5 inches. Attached to this tank is a heating coil, as shown in the illustration, by which the water in the tank can be kept at the boiling point indefinitely. By this method of heating, the errors present in the old apparatus due to direct heating from the flame are entirely avoided. The boiling tank is provided with tubulatures for thermometer and for reflux condenser which may be used if desired. Complete as illustrated..... **6.00**
12264. **CONDUCTIVITY APPARATUS**, similar to No. 12262, but without heating coil and with an electrical heating unit. This method of heating was suggested by the Department of Soil Technology of the New York State College of Agriculture at Cornell University and has proved very satisfactory. For 110-volt current, either alternating or direct. Power consumed, 350 watts **11.00**

For **CONDUCTIVITY BRIDGE**, see No. 12400.

12268. **DIGESTION CUP**, porcelain, for acid digestion of soils (Hilgard's Method). Capacity, 50 cc. **.35**

DISHES, Moisture, see general heading Dishes.

12272. **DRAINAGE AND WATER TABLE APPARATUS**, Graham & McCall's, designed to show the behavior of capillary and free water in the soil, and the principles involved in the proper construction of a barnyard to prevent loss of plant food; of copper, 3x6x12 inches high, with a solid bottom to represent hard clay or stone. Through the vessel are two brass tubes, sawed transversely, which communicate with the outside, representing tile drains at different depths. A standpipe shows the height of free water inside the vessel.

To operate, fill the vessel with soil and pour on water at regular intervals, giving it time to soak into the soil. The water, instead of coming out at the tubes, will pass downward through the soil until the solid bottom is reached, when a water-table of free water will be formed at a height indicated by the free water in the glass standpipe. When the free water has risen to the first opening it will pass outside the vessel, thus proving that a tile drain placed as low as soil conditions will permit removes free water before one placed not so deep.



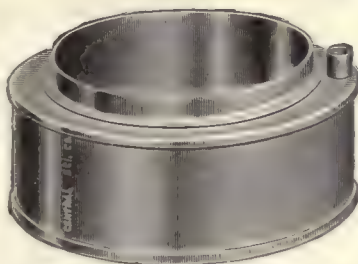
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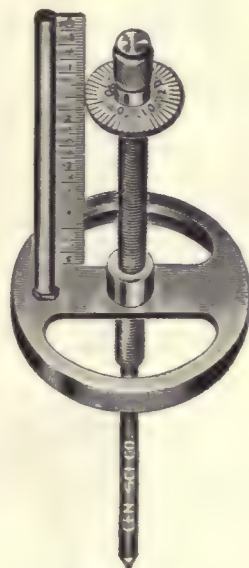
No. 5644.



No. 12282.



No. 12286.



No. 12276.

DRAINAGE AND WATER TABLE APPARATUS, Continued.**Some Things Which the Apparatus Will Show:**

Tile drains do not remove capillary water. A deep drain removes the first water.
 No water is removed until the soil at the drain line is beyond the point of saturation.
 The volume of soil available for plant food is greater in a drained soil.
 The volume of soil retaining capillary water is greater where the drains are deep.
 Plant food would not be wasted by leaching from a barnyard having a tight floor of clay or cement and some kind of retaining wall around the outside..... \$7.50

DRYING OVENS, see general heading Ovens.

5644. **ELUTRIATING FLASK, Benningsen's.** The bulb has a capacity of about 400 cc, and the neck is graduated to 40 cc in 1 cc divisions..... 1.50
12276. **EVAPORATION GAGE, micrometer screw form,** for measuring rate of evaporation, as described in Bigelow's "Manual for Observers in Climatology and Evaporation" (U. S. Weather Bureau No. 409). A micrometer screw is mounted on a cap suitable for supporting it on the top of a still well 3 inches in diameter. The screw proper is 5 inches long with 20 threads to the inch. The micrometer head is graduated in 50 divisions so that readings may be taken to $\frac{1}{1000}$ of an inch. For convenience in reading a linear scale graduated in 20ths of inches is provided. The total distance from the head to the end of the pointer, which is of incorrodible material, is 12 inches. The pointer may be unscrewed and a hook screwed in its place, thus making the instrument serve as a hook gage. Complete as described, with pointer and hook 12.00
12278. **EVAPORATION TANK** for use with No. 12276 Evaporation Gage, of heavy galvanized iron 6 feet in diameter by 2 feet deep. A still well 3 inches in diameter is firmly attached to one side of the tank and connected with the tank at the bottom by a galvanized pipe of sufficient size to allow free flow of water between the tank and still well..... 50.00
- Note.**—Tanks of different dimensions can be furnished if desired.
12282. **EVAPORIMETER,** for determining the amount of water evaporated from the surface of various soils in a given time; for determining the effect on evaporation produced by different fertilizers, and different methods of cultivation. It consists of a brass tube 4 inches in diameter and 9 inches long having a perforated metal bottom to allow free ingress of water. This tube fits into a water-tight spun brass base.
 In operation the tube is filled with soil which is compacted by means of the Soil Compacting Machine (No. 12256). It is then placed in position in the base. Water of known weight is placed in the base whence it passes through the perforated bottom of the tube to the soil and is evaporated from its surface.
 The apparatus is entirely of brass, durably made, highly polished and lacquered..... 5.00
12283. **EVAPORIMETER,** same as No. 12282, but with brass tube 18 inches long..... 5.50
12286. **EVAPORIMETER,** for finding the co-efficient of evaporation from soils. The soil container is of copper with brass bottom perforated with one millimeter circular openings. This container is placed in a copper water jacket 3x8 inches 3.50



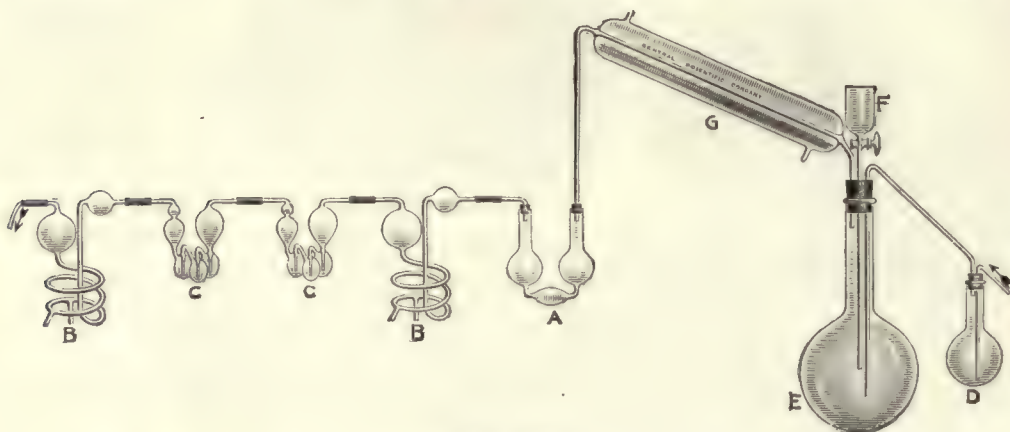
No. 12290.



No. 12298.



No. 12302.



No. 12308.

FILTERS, Soil, see general heading **Filtering Apparatus**.

FURNACES, Muffle, see general heading **Furnaces**.

12290. **LIMESTONE TESTER**, Hopkins, for determining the purity of limestone. The outfit consists of two glass vessels joined together, one for holding the limestone sample, the other for the charge of acid. The apparatus is light and easily weighed. (See Bulletin No. 194 of the University of Illinois Agricultural Experiment Station) \$3.50

For other **LIMESTONE TESTERS**, see **Carbon Dioxide Determination Apparatus**.

MICROSCOPES, see general heading **Microscopes**.

MILLS, Grinding, see **Crushing and Grinding Apparatus**.

MOISTURE DISHES, see general headings **Boxes, Dishes**.

12298. **MULCH CYLINDER**, McCall's, for determining the effect of mulches upon the rate of evaporation from soils. Design as illustrated; of galvanized iron, 19 inches high; approximate diameter at top 4 inches; at bottom 8 inches..... 2.80

12300. **MULCH CYLINDER**, McCall's, same as No. 12298, but 29 inches high..... 3.00

12302. **MULCH CYLINDER**, Stevenson & Schaub's, of galvanized iron 11 inches in diameter by 13 inches high, with water supply tube..... 1.60

NITROGEN DETERMINATION APPARATUS, see general heading **Nitrogen Determination Apparatus**.

12308. **ORGANIC MATTER DETERMINATION APPARATUS**, for determination of organic matter in soils by the wet combustion method. Consists of two flasks, two Mohr-Geissler Potash Bulbs, one Peligot Tube, two Winkler's Spiral Potash Bulbs, Condenser, Dropping Funnel, rubber stoppers and connecting tubes. (See Bulletin 24, U. S. Bureau of Soils)..... 13.50

10932. **POTASH TUBE**, Peligot (A)..... .40

- 10938A. **POTASH BULB**, Winkler's, 100 mm (B)..... 2.00

10916. **POTASH BULB**, Mohr-Geissler (C)..... 1.50

- 5550B. **FLASK**, Potassium Hydrate, 200 cc (D)..... .22

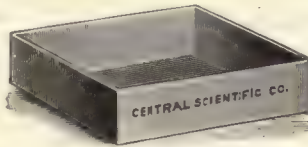
- 5550C. **FLASK**, Round Bottom, 300 cc (E)..... .28

- 6160B. **FUNNEL**, Separatory, 60 cc (F)..... 1.45

- 3224C. **CONDENSER**, 15 inch (G)..... 1.40



No. 12314.



No. 12316.



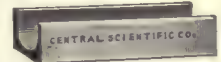
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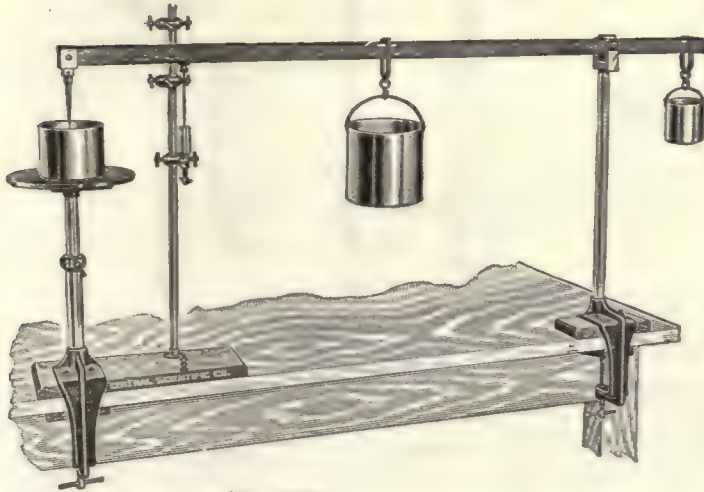
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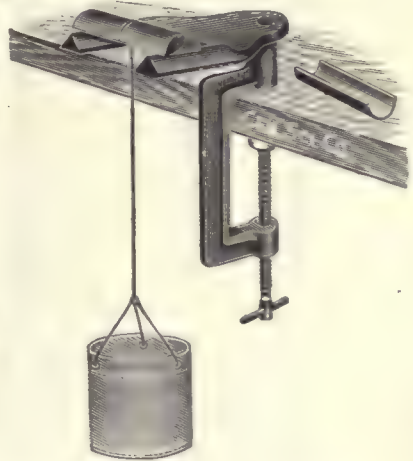
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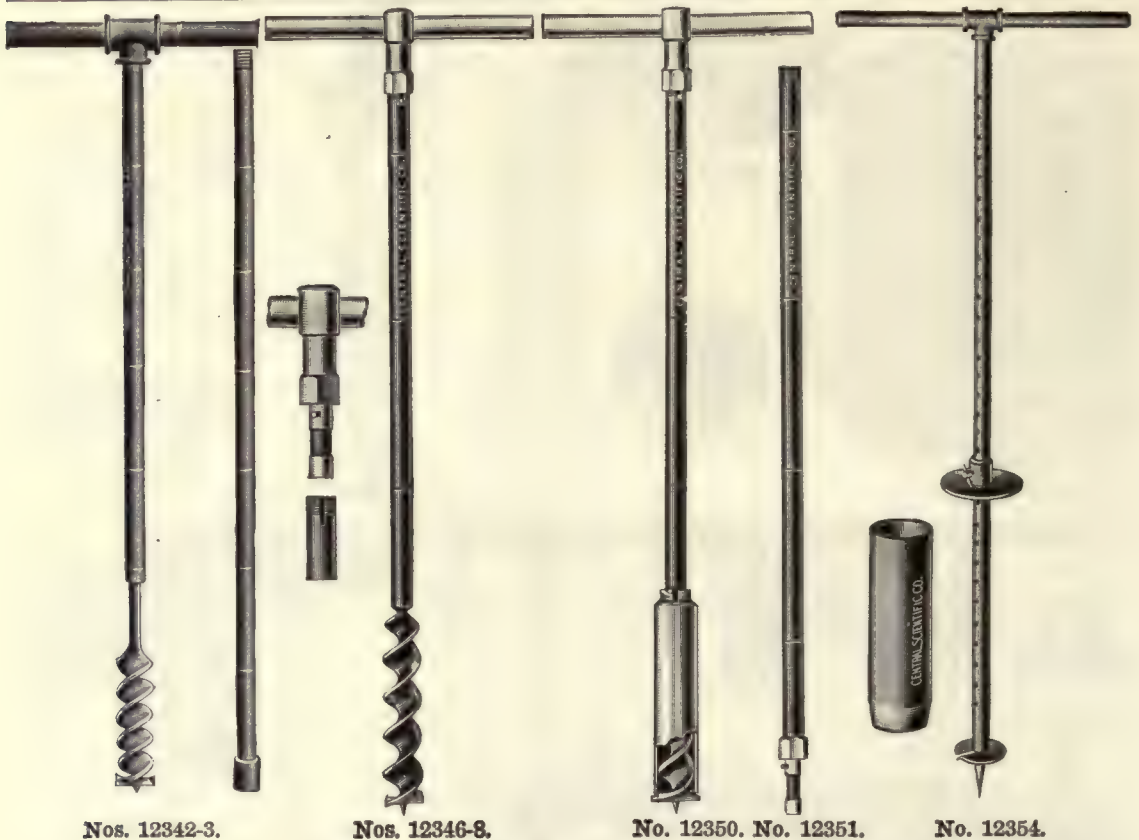


No. 12324.



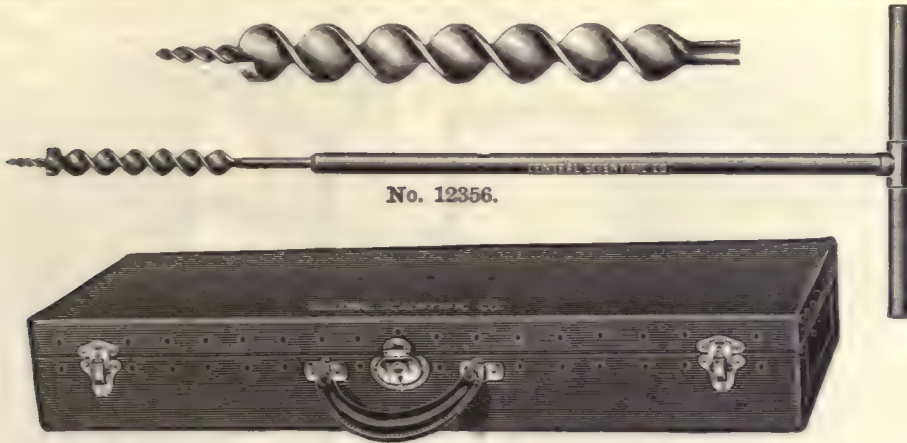
No. 12336.

12314. **ORGANIC MATTER JAR.** A 1-gallon glass jar provided with a round hole for drainage, 1 cm in diameter, located 1 cm above the bottom \$0.75
12316. **PAN**, of metal, water tight, $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{2}$ inches. For use in Drying Ovens..... .25
12223. **PAN**, of zinc, $6\frac{1}{2} \times 6\frac{1}{2} \times 1\frac{5}{8}$ in., as used in No. 12222 Absorption Apparatus. These pans are water tight and will be found convenient for use in drying ovens..... .30
12318. **PAN or BOX**, of zinc, $4 \times 4 \times 4$ inches, for volume-weight experiments..... .50
- SAMPLE CANS OR BOXES**, see general heading **Boxes**.
12324. **PENETROMETER**, for determining the firmness of soil due to its cohesion, by means of the resistance offered to the introduction of a sharp instrument. The apparatus is essentially as described in the Bulletin referred to, but is supplied with a device for making electrical contact when the soil has been penetrated to the desired depth, as suggested by Prof. Charles F. Shaw of the University of California. Complete as illustrated. (See Bulletin No. 50, Bureau of Soils) 50.00
12328. **PERCOLATION APPARATUS**, McCall's, for determining percolation of water through soils. Glass percolator, $1\frac{1}{2}$ pint, with brass extension having lateral tubes. Complete with rubber gasket, copper gauze, etc..... 6.50
- PERCOLATORS**, see general heading **Percolators**.
12332. **PESTLE**, Rubber, for preparing soils for analysis; 7 inches long, wood handle with rubber tip30
12336. **PLASTICITY APPARATUS**, for determining the effects of lime on plastic soils. Consists of a clamp with two knife edges about 4 inches apart, across which the briquet to be tested is placed for breaking, a heavy canvas bag for holding weights and shot and one No. 12337 Mold, 5 inches long, 1 inch wide and $\frac{3}{4}$ inch deep, as illustrated. For those who wish a mold of more accurate dimensions, the purchase of No. 12338 Mold is recommended. (This design has been developed from the original in use at the University of Illinois, in co-operation with the Soil Physics staff of the University)..... 2.50
12337. **MOLD** only of No. 12336..... .25
12338. **MOLD**, improved form, for No. 12336, as suggested by A. F. Gustafson of the University of Illinois. Of cast brass, accurately milled to shape. All molds are therefore identical and always occupy the same position on the table, so that the bricks of soil obtained are accurate and uniform in shape. Inside cross section $\frac{1}{2}$ square inch, length, 5 inches..... 1.00



SOIL SAMPLING APPARATUS

12342. **SOIL AUGER** for obtaining soil samples. Length 36 inches with graduations every 6 inches; handle detachable; steel cutting edge $1\frac{1}{2}$ inches in diameter. The length may be increased to 72 inches by the insertion of No. 12343 Extension. Complete with handle but without additional length..... **\$3.50**
12343. **EXTENSION** of 36 inches for use with No. 12342 **1.00**
12346. **SOIL AUGER**, improved form with stem and handle of smooth finished steel. The handle is attached by means of a lock nut of new design which entirely does away with the loosening and tightening up at the joint which has caused so much difficulty in the earlier types of Soil Augers. This Auger has been made 24 inches long for convenience in carrying when in the field. For use at greater depths extensions 2 feet long and 4 feet long have been provided. (See Nos. 12351 and 12352.) The auger bit is $1\frac{1}{2}$ inches in diameter and the stem is graduated every 6 inches. This is a thoroughly high-grade tool for the most exacting service **7.50**
12348. **SOIL AUGER**, same as No. 12346 but with auger bit 2 inches in diameter..... **9.00**
12350. **SOIL AUGER**, with Sleeve, for use in dry soils. This Auger is the same as No. 12346 except that it is provided with a steel sleeve which fits over the auger bit, resting on a projection at the lower end so that the diameter of the cutting edges is larger than the outside diameter of the sleeve. This sleeve is held firmly in position at the upper end by an ingenious locking device and serves to hold in position the dry soil which otherwise would not cling to the Auger when removed from the ground. 2 feet long, graduated every 6 inches. Complete with sleeve and handle..... **9.00**
12351. **EXTENSION**, for use with Nos. 12346 to 12350 Soil Augers. Complete with lock nut. Exactly 24 inches long and graduated every 6 inches..... **3.00**
12352. **EXTENSION**, for Nos. 12346 to 12350 Soil Augers. Same as No. 12351 but exactly 48 inches long **4.00**
12354. **SOIL AUGER**, Nebraska Design, designed for general work in soil investigation; especially adapted to work where samples at exact depths are desired, since with this instrument it is possible to secure samples of soil one inch in thickness to a total depth of two feet. This type of auger has been used with satisfactory results by the Nebraska Agricultural Experiment Station in securing samples of soil for chemical analysis and soil moisture studies. The auger is also well adapted for use in making determinations of the apparent specific gravity of soils under field conditions, since a definite volume of soil may be removed without the necessity of digging around a tube and cutting the soil off even with the lower edge.
- In use the auxiliary tube is driven into the soil to such a depth that when the auger blade is just resting on the surface of the soil, the adjustable gage may be set in the first notch on the auger stem, and at the same time rest on the top of the tube. The gage is then raised



No. 12356.

No. 12362.



No. 12360.

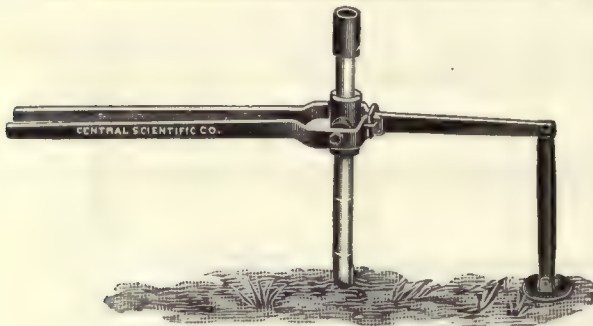
Nos. 12370-2.



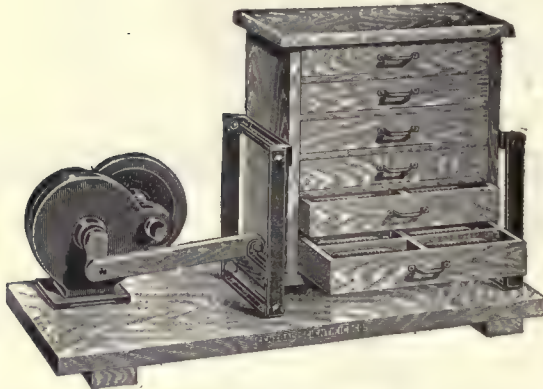
No. 1878.

to the next notch and the auger turned until the gage again comes in contact with the top of the tube, or, in other words, has removed one inch of soil, since the notches are one inch apart. In this manner, a sample of soil from each inch may be obtained to a depth of 2 feet. Complete with auxiliary tube..... 9.00

12356. **SOIL AUGER, Pugh's.** According to Dupont specifications this auger is especially designed for use in hard ground, and is the best tool on the market for penetrating the hard pan. It is hand-made out of special steel, and actual tests made in all parts of the world have proved that one Pugh will outwear and outbore a dozen or more of any other make. Useful for soil sampling, tree planting, ditching, drainage and other earth boring where deep holes are required, or where the ground is hard. With extensions it can be lengthened so as to reach to any desired depth; it is used very extensively for prospecting or for well boring, as well as for agricultural work. Length, 4½ feet; weight, 10 to 12 pounds; bit, 1½ inches in diameter; complete with handle 18 to 21 inches long **\$5.10**
12357. **EXTENSION for No. 12356 Soil Auger.** Length, 3 feet..... **1.00**
12360. **FOOT PLATE**, for use with any Soil Auger 2 inches or less in diameter to prevent the crumbling away of the soil around the edge of the hole. Consists of a steel tube slightly over 2 inches in diameter provided at the upper end with a steel plate about 4.5x10 inches. The tube is driven into the ground before the sampling hole is started and the Plate makes a convenient rest for the feet during the entire operation of removing samples..... **2.50**
12362. **CARRYING CASE**, for Auger Field Set, substantially made of hard black fiber with lock and clasps, and handle for carrying. Compartments are provided for holding one No. 12346 Auger (or one No. 12350 Auger), one No. 12348 Auger, two handles for the above, four No. 12351 Extensions, and a wrench for the lock nuts. Complete with Wrench, but without Augers or Extensions **7.50**
12364. **AUGER FIELD SET**, consisting of No. 12362 Carrying Case with wrench, one No. 12346 Auger, one No. 12348 Auger, and four No. 12351 Extensions **27.00**
12366. **AUGER FIELD SET**, same as No. 12364, but with No. 12350 Auger instead of No. 12346. **27.00**
12370. **SOIL SAMPLING TUBE, King's.** Tube of brass, 5 feet long, graduated every 6 inches. Cutting head of steel with area of opening one-ten millionth of an acre. Steel collar at top to receive blows of hammer shown in illustration. This hammer is of cast iron, weighing 8 pounds, and is of suitable shape to be held easily in the hand.
- To obtain soil samples the tube is driven into the ground to the desired depth by means of the hammer. A column of soil is thus forced up into the tube from which it is jarred after removal from the ground. The outside of the cutter being larger than the tube allows it to be drawn from the ground more easily. If, however, the tube is not withdrawn from the ground with sufficient readiness, No. 12374 Tube Hoist should be used.
- With Hammer..... **8.00**
12372. **SOIL SAMPLING TUBE, King's**, same as No. 12370, but 3 feet long. With hammer... **7.00**
1878. **SAMPLING TUBE BRUSH**, for cleaning Nos. 12370 and 12372 Soil Sampling Tubes. Bristle brush, with strong wire handle. Total length, 65 inches..... **.25**



No. 12374.



No. 12388.



No. 12378.

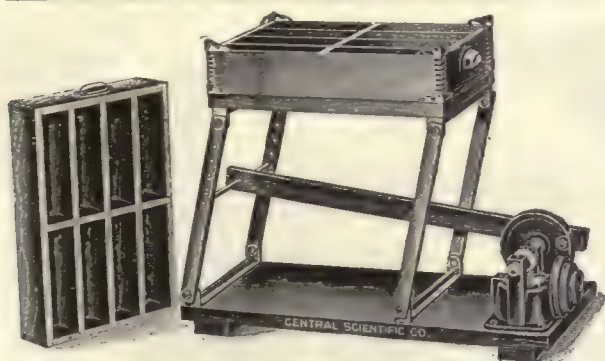


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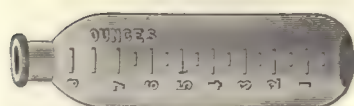


No. 12376.

12374. **SOIL SAMPLING TUBE HOIST.** This contrivance will fill the need for some device for removing Soil Sampling Tubes from the ground. Movement is imparted upward on the handle and, the leverage being ample, no great effort is needed to remove tubes from the most solid soils. Hoist only, without Sampling Tube..... \$8.00
12376. **SOIL SAMPLING TUBE, Whitney's,** especially useful for obtaining samples for determination of moisture content and nitrifying power of soils; a brass tube 9 inches long, sharpened at one end and with a mark 6 inches from that end, provided with rubber caps for closing each end air tight..... .70
12378. **SOIL SAMPLER, Bacteriologist's,** after specifications by H. A. Noyes of the Purdue University Agricultural Experiment Station. This sampler is a brass cylinder 11 inches long by 2 inches in diameter, with an especially constructed cutting edge. The end having the cutting edge is furnished with a tight fitting brass cap 2 inches in height. When the upper end is plugged with absorbent cotton, the sampler is ready for sterilization. The sampler is easy to sterilize, easily kept clean, easy to use, and durable, and hence will be found valuable in bacteriological work. This apparatus will (1) sample accurately soil subjected to any system of management; (2) not interfere with the field conditions existing where the sample is taken, thus making future samples comparable; (3) give a representative sample of soil; and (4) keep the sample practically under field conditions until analyzed, since the tube itself acts as container for the sample. Graduated as shown in the illustration, and with directions for use..... 2.50
12379. **DRIVING HEAD,** of cast iron, for use with No. 12378 Soil Sampler..... .40
12382. **SAMPLING CLOTH,** 18x18 inches, for receiving soil samples from Soil Samplers. Impervious to moisture..... per dozen 1.00
12386. **SAMPLE CARRYING OUTFIT.** The inconvenience of cumbersome fruit jars and soil bags is done away with in the design illustrated. A neatly finished carrying case, with door and handle, holding one dozen seamless tin cans of one pint capacity, with tight-fitting lids. (See No. 1828.) The suitability of these cans for drying pans makes this an economical outfit, since special pans for the drying oven are not needed. Complete with one dozen cans... 4.50
1828. **SOIL SAMPLE CANS, Seamless Tin,** same style as used in No. 12386.
- | | | | | | | | |
|-----------------------|---------------|-----|-----|-----|------|------|------|
| Capacity, ounces..... | $\frac{1}{2}$ | 1 | 2 | 4 | 8 | 16 | 24 |
| Per dozen..... | .25 | .30 | .50 | .70 | 1.00 | 1.60 | 1.80 |
- For other **SOIL SAMPLE CANS AND BOXES,** see Boxes.
- SOIL SAMPLE JARS,** see Jars.
- SOIL SCOOPS,** see general heading Scoops.
12388. **SHAKER, Chest of Drawers Design,** for preparing soils for mechanical analysis. Essentially as described in Bulletin 84 of the Bureau of Soils, but with hinge mounting similar to that described under No. 12060 Shaker. The gearing is of the enclosed type and is arranged to be belted to any $\frac{1}{4}$ h. p. motor having V-groove pulley. The chest is substantially made of hardwood nicely finished, and has six drawers each with eight compartments for holding No. 12391 Sterilizing Bottles. Complete on a massive hardwood base with forty-eight No. 12391 Sterilizing Bottles, but without motor..... 78.50
- For **MOTORS** for use with No. 12388, see general heading Electrical Instruments.



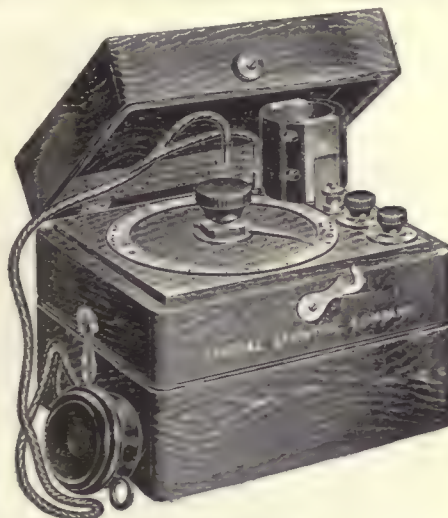
No. 12390.



No. 12391.



No. 12394.



No. 12400.

12390. **SHAKER, Tray Design**, for preparing soils for mechanical analysis. Two trays with compartments for eight bottles each are mounted on a wooden platform attached to a substantial wooden base by four hinged metal supports. The shaking movement is imparted through a worm gear mounted on the same base. Sufficient power will be furnished by a $\frac{1}{8}$ h. p. motor. The trays are both made removable for convenience in handling and filling. Complete with sixteen bottles, but without motor \$53.50

12391. **BOTTLES, Sterilizer**, for use in Nos. 12388 and 12390. Capacity, 8 oz. per dozen .90
SHAKER, Soil Sieve, see No. 12148.

12394. **SHRINKAGE APPARATUS** for determining the shrinkage of soils, as described in Mosier and Gustafson's "Soil Physics Laboratory Manual," and used at the University of Illinois. This is a tray of brass, 3 inches square at the top, with beveled sides to facilitate removal of the soil sample. In use, a piece of cheese cloth is placed on the bottom of the tray, which is then filled with moist soil. The soil block is then removed from the tray and allowed to dry. The shrinkage in area may readily be determined by measurement. 45.00
SIEVES for Soil Analysis, see general heading **Sieves**.

SOIL CONTENT TESTERS

12400. **CONDUCTIVITY BRIDGE**, for determining the soluble salt content of soils; made after designs approved by the U. S. Bureau of Soils.

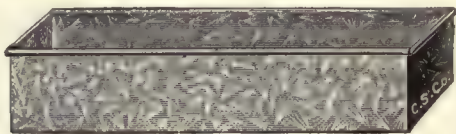
The use of this bridge depends on the fact that the electric current is conducted by the salt in solution and that the conductance of the solution or, conversely, its resistance to the passage of the current, is determined largely by its concentration. The magnitude of current that will pass is increased by an increase of salt in solution; or the resistance to the passage of the current decreases with the increase of salt. The instrument is of general utility in measuring the resistances of solutions of soils. It is designed primarily for use as a field instrument, and finds its greatest use in determinations of "alkali" or harmful excess of soluble salts, frequently present in the soils of arid and semiarid areas. In survey work it gives a convenient method for determining in the field the percentage of alkali in a soil, so that the mapping may be carried on concurrently. It is also useful in determining the salt content of irrigation and seepage waters.

The instrument, by means of which resistances are measured, is a modified form of slide-wire Wheatstone's bridge. In operating the bridge, the cup is filled with the soil saturated with water, and placed in the clips provided for it. The resistance of the cup contents is then read, and from the resistance the amount of soluble salt present determined by reference to the tables given in the Bulletin mentioned above. (See Bulletin 6, U. S. Bureau of Soils.) Complete as described \$150.00

Note.—Bridges of the above type made by us have proved satisfactory to and met the requirements of the U. S. Bureau of Soils, Washington, D. C.

Bridges of this type are used by the Atchison, Topeka & Santa Fe Railway Company for testing the alkali content of their tank water.

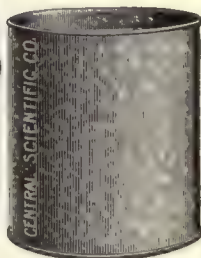
12401. **DRY BATTERY**, complete, as used in No. 12400 Conductivity Bridge 1.25



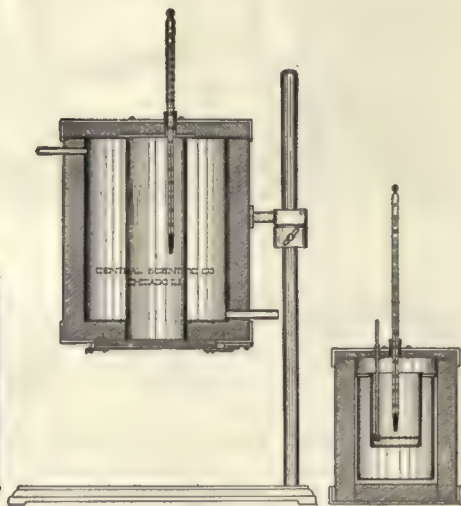
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No. 12404.



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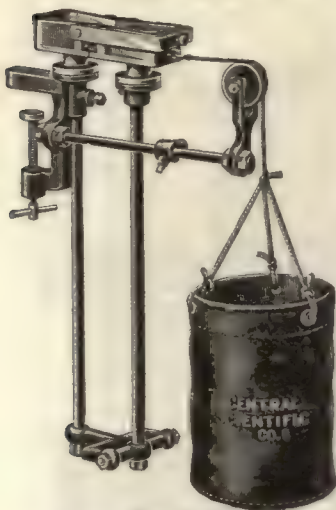


No. F2333.

- 12404. SOIL ACIDITY TESTER, Truog.** This apparatus is made after specifications by E. Truog of the University of Wisconsin. The principle employed is an entirely new one and indicates clearly not only the presence of soil acidity but the degree of the acidity. Consists of a specially designed Alcohol Heater together with a Graduated Boiling Flask, Brass Measuring Cup, Brass Measuring Spoon, Spatula, and all necessary reagents. The test is completed in from 10 to 15 minutes, and the presence of acidity is shown by discoloration of the white test paper used, and the degree of acidity by the exact color assumed by the paper as compared with a chart of standard colors furnished. A full set of directions giving exact description of the test with all precautions is included. Complete as described, in a neat hardwood carrying case..... **\$7.50**

Parts for No. 12404.

- | | |
|--|-------|
| 12405. FLASK , 300 cc capacity, with mark at 100 cc..... | .75 |
| 12406. MEASURING CUP for soil..... | .20 |
| 12407. MEASURING SPOON for reagents..... | .15 |
| 12408. TEST PAPER , 50 sheets in glass vial..... per vial | .15 |
| 12409. SET OF REAGENTS , sufficient for making 50 tests, consisting of a bottle containing 55 grams of a mixture of calcium chloride and zinc sulphide specially prepared, vial of test paper (50 strips), and measuring spoon..... | .75 |
| F2333. SPECIFIC HEAT APPARATUS (modified design after Prof. A. G. McCall) for determining the Specific Heat of Soils; may also be used for determining the specific heat of any substance. Consists of a double-walled heater or steam jacket with large rectangular base and support rod, and a double-walled calorimeter. Both heater and calorimeter are of very substantial construction, and are well insulated. The heating chamber extends through the heater and is closed at both ends with heavy insulated covering. The top cover has two openings, one for a thermometer, and the other for suspending the sample to be tested. The clamp which holds the heater rests on a collar which is clamped to the support rod, so that when the sample has come to a constant temperature the lower cover of the heater can be swung back out of the way and the heater rapidly swung around to a position over the calorimeter. The transfer of the specimen from heater to calorimeter can thus be readily and quickly effected. Heater and calorimeter complete as described, but without thermometers..... | |
| F2334. CALORIMETER only of No. F2333 without thermometers | 10.00 |
| 12420. TANK for holding water, of galvanized iron, 12 inches in diameter, with drop handles, for use with all soil tubes 14 inches long, or under (e. g., No. 12492)..... | 1.90 |
| 12422. TANK for holding water, of galvanized iron, 12 inches in diameter. For use with soil tubes 36 inches long, or under; made especially for No. 12444 Tube..... | 3.50 |
| 12424. TANK for holding water, of galvanized iron, 26x6x6 inches. For use in all capillarity experiments. Used with Tubes Nos. 12444-12464..... | 1.80 |



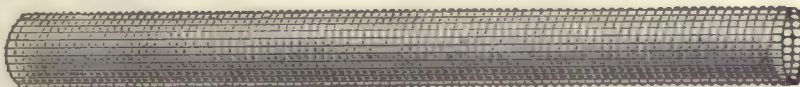
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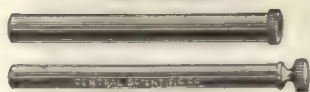
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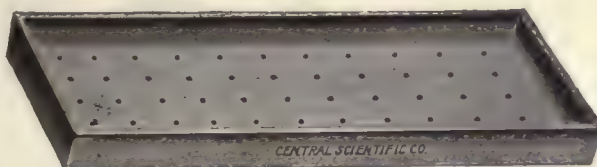
No. 12448.



No. 12454.



No. 12445.



No. 12434.

12430. TENACITY OF SOILS APPARATUS, for determining the tenacity of moist soils. In this new and improved design, which has been developed from the original in use at the University of Illinois, the inaccuracies due to friction, caused particularly by a collection of dirt on the moving parts of the instrument, have been completely obviated, and constant conditions thereby assured. Two brass soil containers are supported on a hinged frame which in turn is securely clamped to the table top. The soil containers are removable from the frame and are so constructed that they may be immediately replaced in exactly the same relative position. In use, the containers are held firmly together by means of the metal stirrup shown in the illustration; the moist soil is compacted in the containers and smoothed level with the top, thus leaving one square inch section for testing. Weights are now placed in the hanger sufficient to pull the soil apart. Complete, as illustrated, with canvas hanger, but without weights \$12.00

THERMOMETERS, Soil, see general heading **Thermometers**.

- 12434. TRAY, Color**, for testing effects of color of soils on temperature. Waterproofed wooden tray, 6 ft. x 3 ft. x 6 inches deep, with drainage..... 15.00
- 12436. TRAYS, Drainage**, for showing effects of drainage on temperature of soils. Two water-proofed wooden trays, each 3 ft. x 4 ft. x 6 inches deep, one made water tight, the other provided with drainageper set 25.00
- 12438. TRAY, Puddling**, for mixing and working soils. Water tight, waterproofed wooden tray, 25 inches x 25 inches x 2¼ inches. Will not warp 3.50

TUBES, SOIL, ALL KINDS

- 12444. TUBE, Capillarity, McCall**, with side tubes for studying the distribution of moisture in vertical columns of soil; also for determining the lateral movement of capillary moisture. Of brass, 36 inches long by 2 inches in diameter, with perforated bottom and small lateral tubes at definite intervals..... 3.75
- 12445. TUBE, Sampling**, for use in obtaining samples from the side openings of No. 12444 Capillarity Tube as suggested by Prof. John A. Slipher of Purdue University. A brass tube with diameter slightly contracted at the sharpened end is provided with a plunger by which the sample of soil may be ejected..... .90
- 12448. TUBE, Capillarity, McCall**, for determining the rate of the capillary rise of water in soils. Of brass, 36 inches long by 2 inches in diameter, with perforated bottom. Running lengthwise of the tube is a slot fitted with a window of thin celluloid through which the moisture height may be noted. The construction of this tube is such that an additional length, which the illustration shows in place, may readily be attached. Without additional length..... 4.50
- 12450. TUBE, Extension**, with coupling for studying rise of moisture to greater height than is possible with No. 12448 alone. Of brass, 36 inches long.
With coupling 5.00
- 12451. CELLULOID STRIP**, 36x3 inches, for either No. 12448 or No. 12450..... .60
- 12454. TUBES, Capillarity**, of celluloid protected by wire gauze. These tubes consist of a cylinder of galvanized iron wire gauze 2 inches in diameter, surrounding a cylinder of thin transparent celluloid formed of a strip of celluloid sufficiently wide to go 1½ times around the tube. These tubes are soil tight, transparent, and durable, and are very satisfactory for studying the distribution of water in capillary rise experiments, since the inner tube may be withdrawn and unrolled, exposing the soil for easy sampling.

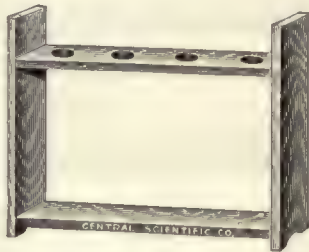
Length, inches.....	12	24	36	48
Each65	1.00	1.50	2.80



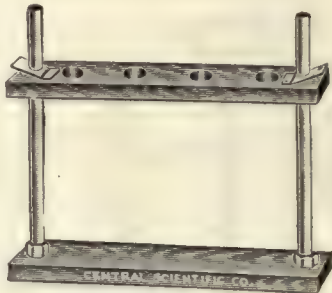
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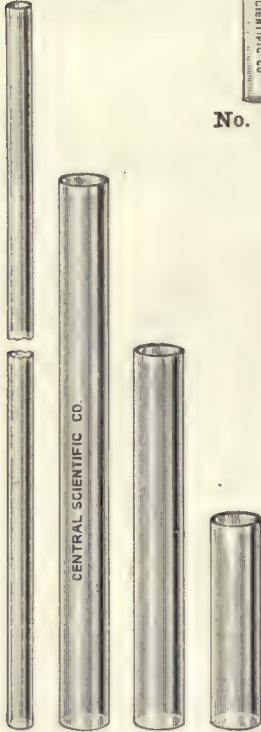
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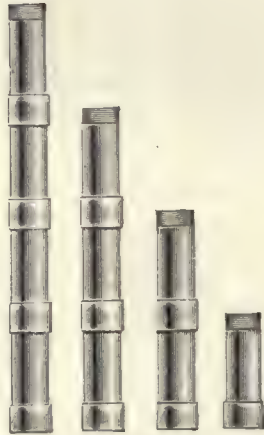
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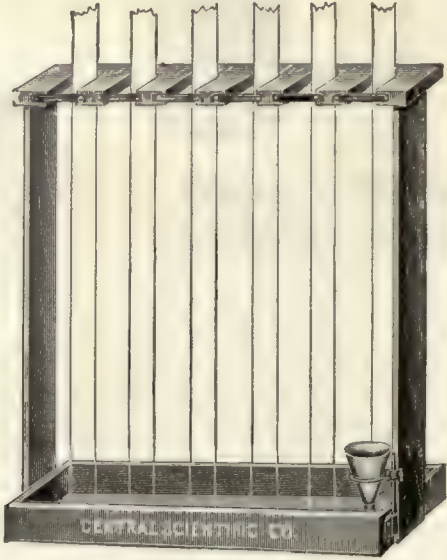
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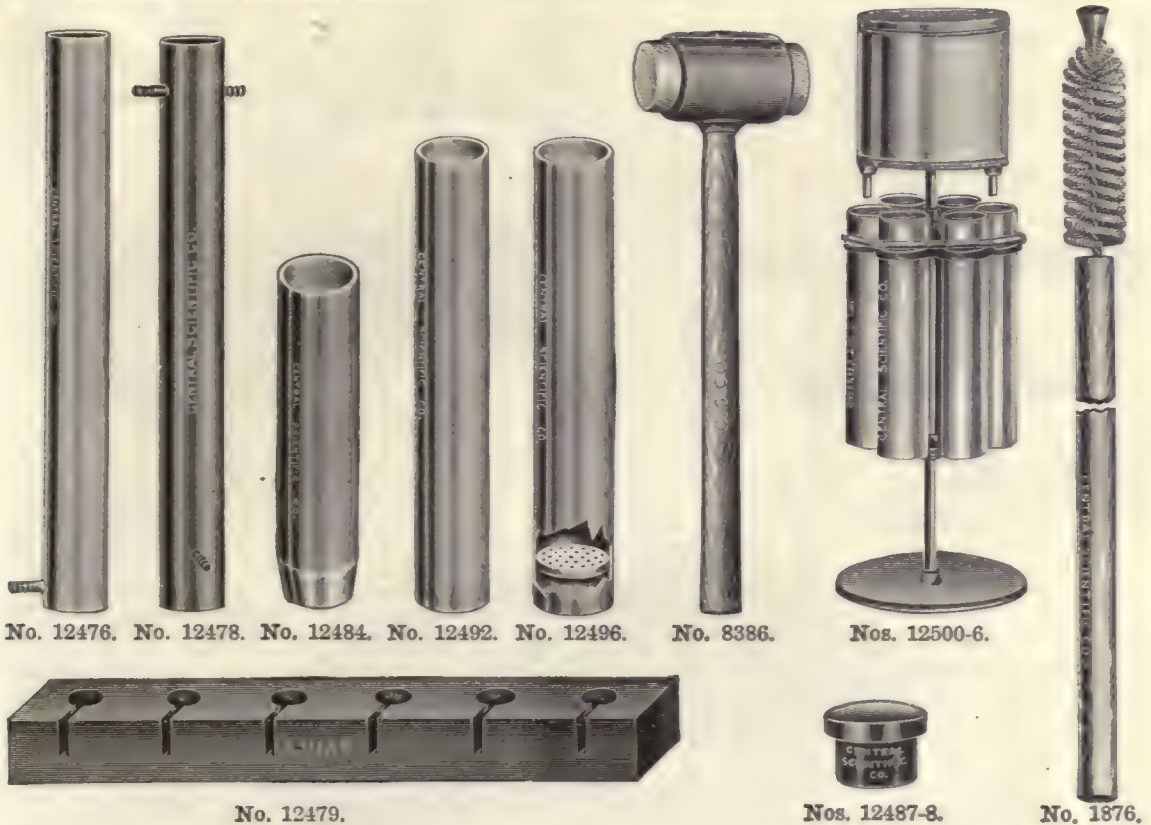


No. 12458.



No. 12462.

12455. CELLULOID STRIPS for No. 12454 Tubes.				
Length, inches	12	24	36	48
Each	\$0.18	.38	.54	.96
For CLEANING BRUSH , see No. 1876.				
For SUPPORT , see No. 12462.				
12458. TUBES, Capillarity, Sectional , for determining capillary rise of water in soils. These sections are made of heavy brass tubing and are 8 inches long by 1½ inches in diameter. Each section is threaded at both ends to receive brass couplings so that the tubes may be built up to any desired length. The tubes may readily be cleaned, and the breaking of the soil column which causes so much annoyance in long brass and glass tubes is obviated, because the section joints, which are tight enough to prevent evaporation losses from the soil, are loose enough to permit equalization of air pressure inside and outside of tube. (For Bottom Tube, see No. 12459 below.) Per section (with one coupling).....	125			
12459. BOTTOM TUBE , for No. 12458 with perforated bottom. For use as lowest tube of set..	150			
12462. CAPILLARITY TUBE SUPPORT for supporting 2-inch tubes 32 inches long or longer in a vertical position. Will hold six tubes which may be readily removed or put in place. The base is constructed in form of a tray and holds a water-tight zinc tank. A rod and ring at the side of the tray is designed to hold an inverted flask so that the height of the water in the tray may be kept constant. Complete as illustrated, but without flask or tubes..	9.00			
12464. TUBES, Capillarity, Glass.				
Diameter, inches.....	2	2	2	1
Length, inches.....	8	15	24	60
Each .....	.70	1.20	1.30	.80
12465. PERFORATED BOTTOM for 2-inch Glass Soil Tubes. May be used with tubes from 1½ inches to 2¼ inches in diameter. Clamps firmly to the bottom of the tube, but may readily be removed for changing from one tube to another .....	.30			
For CLEANING BRUSH , see No. 1876.				
2818. CAPILLARITY TUBES, Glass , student's lamp chimney form.....	per dozen	1.80		
12468. SUPPORT , of wood, for holding four No. 2818 Capillarity Tubes.....		1.40		
12472. SUPPORT , for four No. 2818 Capillarity Tubes, more substantial than No. 12468. Base of wood with metal uprights and adjustable shelf for supporting tubes; finely finished.....		2.50		
F3355. TUMBLERS , for use with No. 2818 Tubes; ½-pint size.....	per dozen	.60		



- For **ORGANIC MATTER TUBES**, see No. 12464.
12476. **TUBE, Percolation of Air**, for comparing the rate of the flow through soils. Made of brass, 18 inches long by 2 inches in diameter, with outlet tube near bottom..... \$2.00
12478. **TUBE, Percolation of Water**, for determining the rate of percolation of water through soils. Of brass, 18 inches long by 2 inches in diameter, with lateral inlets and drainage tube, and with solid bottom below and perforated bottom above drainage tube..... 2.00
12479. **SUPPORT BLOCK**, for use with No. 12478 Percolation Tube. This block is necessary when several soils are to be compared..... 1.75
- For **CLEANING BRUSH**, see No. 1876.
12484. **TUBE, Specific Gravity**, for determining the apparent specific gravity of surface soils under field conditions. Of steel, 12 inches long by 3 inches outside diameter, with cutting edge 2.75
12486. **TUBE, Specific Gravity**, same as No. 12484, but 4 inches inside diameter..... 5.00
12487. **DRIVING HEAD**, of cast iron, for use with No. 12484 Specific Gravity Tube to prevent battering the upper edge when the tube is driven into the ground..... .50
12488. **DRIVING HEAD**, same as No. 12487, but for use with No. 12486 Tube..... 1.50
8386. **MAUL** for driving No. 12484 Specific Gravity Tube. Substantially made of iron with hardwood faces. The handle is two feet long, and the Maul is sufficiently heavy for its purpose, without being clumsy.....net 1.40
12492. **TUBE, Volume Weight**, for determining volume weight and pore space. Of brass, 12 inches long by 2 inches in diameter, with solid bottom, and crease one inch from the top..... 1.25
12494. **TUBE, Volume Weight**, for elementary work, of brass, $1\frac{1}{2} \times 3\frac{1}{2}$ inches..... .40
12496. **TUBE, Water Holding Capacity**, brass, 12 inches long by 2 inches in diameter, with perforated bottom, $1\frac{1}{2}$ mm perforations, and crease one inch from top..... 1.25
1876. **TUBE BRUSH**, for cleaning soil tubes of 2 inch diameter; has a wooden handle 3 feet long and is provided with a tuft of bristles at the end for reaching the bottom corners of the tube .60
12500. **TUBES, Soil**, so constructed that one style of tube may be used for all experiments. They are made from brass tubing 10 inches long and 2 inches in diameter. A cast brass base, which is corrugated on its upper surface, is soldered into the bottom of the tube. On the lower surface of this casting is a connection for rubber tubing. A brass disk with circular perforations, and somewhat smaller than the inside of the soil tube, is dropped to the bottom of the tube and rests on the corrugated surface of the brass base, allowing free passage of air or water through the tube. The tubes are so constructed that they can be connected in series by means of rubber tubing so that a constant water level may be obtained in all the tubes.
- Each 1.50



No. 12512.



No. 12508.



No. 12538.



No. 12540.



No. 12552.

12502. **TUBE RACK** for 6 No. 12500 Soil Tubes. The tube rack consists of a cast iron base, smoothly finished and japanned, to which is attached an upright standard. On this standard are carried two castings, the lower one being arranged to take and hold the lower ends of the soil tubes by means of lugs on its upper surface, and the upper consisting of a series of rings to support the upper ends of the soil tubes in a concentric position. This arrangement holds the tubes securely, but still allows them to be removed or replaced very easily. At the same time it is compact, the rack and tubes occupying less than one square foot of desk room..... \$2.00
(For illustration, see page 459.)

12506. **SUPPLY TANK**, used in determining the comparative rate of flow of water through various soils. This tank is made of polished brass and rests on the top of the standard of the tube rack by means of a socket in its base. Two short brass tubes extend downward from the base of the tank in such a position as to fall within the two soil tubes on opposite sides of the rack. The six soil tubes having been connected in series, the water flows from the tank to the soil tubes, maintaining a constant water level therein..... 3.50
(For illustration, see page 459.)

12508. **SOIL TUBE AUGER** for removing wet soil from tubes. This auger is 1 1/4 inches in diameter, of twist pattern and made from polished cast steel. Will clean tubes to the bottom..... 2.50

12512. **WATER RETENTION CUP**, for determining the maximum water retained by soil. Of brass 2 inches in diameter by 3/8 inch high, with diaphragm of perforated metal fastened about 1/16 inch below top. This cup is used in studying the wilting point by means of the direct relationship which exists between the maximum water retained by any soil and the wilting point. (See Hilgard's "Soils," page 209)..... .30

12530. **SOLDER, Bar Form**, half lead and half tin. Approximate weight, 1 1/2 lbs..... Per bar 1.50

12532. **SOLDER, Wire Form**, half lead and half tin..... Per pound 1.00

12534. **SOLDER, Wire Form**, with resin center; half lead and half tin. Used for all electrical joints and splices where danger of corrosion must be eliminated. No flux required when using this solder. In 1-pound packages..... Per package 1.25

12538. **SOLDERING COPPER**, 1/2 lb., with handle..... .60

12540. **SOLDERING COPPERS, Electric**, for either A. C. or D. C. circuits. Tip interchangeable and can be replaced instantly. With cord and plug. In ordering please state exact voltage.

No.	A	B
Length, inches.....	10	14 1/8
Weight, ounces	9	18
Diameter of tip, inches.....	1/2	3/8
Watts	60	150
Each	7.50	9.50

12544. **SOLDERING COPPER, Jewelers'**, 1 ounce, high grade, for instrument use..... .25

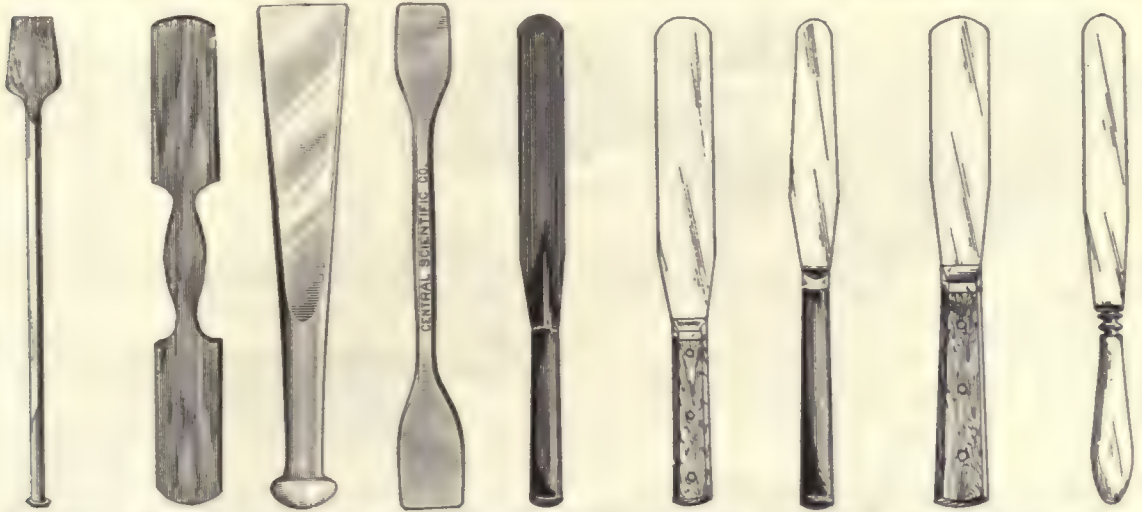
12548. **SOLDERING PASTE**, easy to apply, non-acid, fumeless, non-corrosive. Especially useful for electrical work and in out-of-the-way places. In metal cans.

No.	A	B
Size, ounces	2	8
Each .....	.35	.85

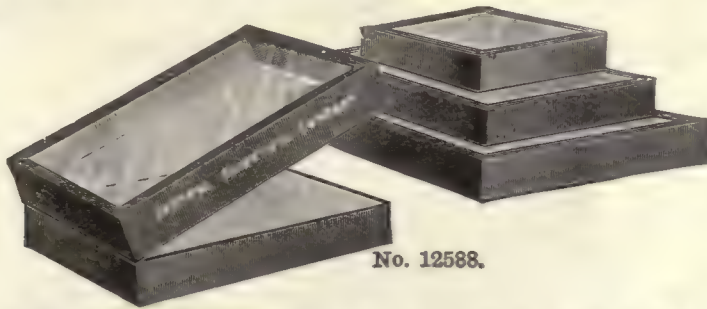
12552. **SOLDERING OUTFIT**, consisting of a soldering iron, bar of solder, scraper and flux, in a neat wood box60

12554. **SOLDERING OUTFIT**, less elaborate than No. 12552, consisting of soldering iron, piece of wire solder, and flux..... .25

SOLDERING IRON HEATER, see Burners Nos. 2114-6.



No. 12564. No. 12568. No. 12572. No. 12573. No. 12574. No. 12576. No. 12578. No. 12580. No. 12582.



No. 12588.

12564. **SPATULA**, Glass, 6 inch blade ground on both sides. Width of blade, $\frac{5}{8}$ inches..... \$0.25

12568. **SPATULAS**, Horn, double, with spatula on each end.

Length, mm	100	125	150	200
Each .....	.10	.12	.15	.25

SPATULAS, Platinum, see Platinum Ware.

12572. **SPATULAS**, Porcelain, with paddle at one end, knob at the other, glazed throughout.

Length, mm.....	115	155	200	275	310	345	442
Each .....	.35	.42	.62	.85	1.10	1.30	2.65

12573. **SPATULAS**, Porcelain, double, with spatula at each end.

Length, mm	105	120	150	195	212	225
Each .....	.25	.35	.42	.55	.72	.85

12574. **SPATULAS**, Hard Rubber, solid, with flexible blade.

Length, inches	4	5	8
Each .....	.30	.40	.50

12576. **SPATULAS**, Steel, Flexible, with cocoa wood handle.

Length of blade, inches.....	3	4	5	6	8	10	12
Each .....	.36	.40	.45	.60	.95	1.50	2.30

12578. **SPATULAS**, Steel, Very Flexible, with narrow point for weighing, and wood handle.

Length of blade, inches.....	4	5
Each .....	.60	.80

12580. **SPATULA**, Steel, with special 4 inch blade, very stiff. Widely used in baking and milling laboratories for gluten mixing..... .90

12582. **SPATULAS**, Solid Steel, Flexible, with balanced handle, nickel-plated.

Length of blade, inches.....	3	4	5	6
Each .....	.60	.70	.75	.85

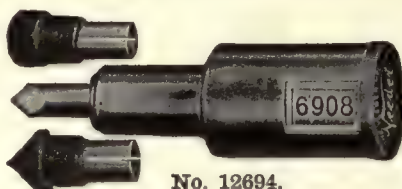
SPECIFIC GRAVITY APPARATUS, see Bottles, Specific Gravity; Hydrometers; also Nos. 392, 1734, 2500 and 11048.

12588. **SPECIMEN MOUNTS**, Riker's, suitable for mounting insects, butterflies, fungi, shells, etc., or thick bulbs or plants too large for the Botanical Mounts, No. 1556.

Size, inches	2½x3	4x5	5x6	6½x8½	8x12	12x16
Each15	.20	.25	.30	.50	1.00
Per dozen	1.75	2.30	2.80	3.50	6.00	12.00



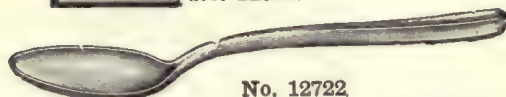
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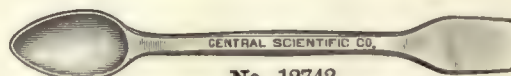
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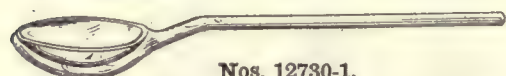
No. 12698.



No. 12722.



No. 12742.



Nos. 12730-1.



No. 12744.



No. 12734.



No. 12746.



No. 12736.



No. 12748.

12692. **SPEED COUNTER or REVOLUTION COUNTER**, suitable for any purpose requiring a small, light and accurate counter. Registers up to 99,999. Its action is very smooth and uniform and it will stand a very high rate of speed. If run backwards, it counts backwards. Illustration is full size. Nickel-plated \$1.50
12694. **SPEED COUNTER or REVOLUTION COUNTER**, with ball thrust bearing and spring clutch which allows the spindle to turn freely until the second hand of one's watch has come to zero; a slight pressure on the end of the instrument starts the count; when pressure is released the count stops. Registers 9,999, and can be used on either high speed or low speed machinery. One pointed and one flat rubber tip furnished which serve as insulators when taking the speed of electric machinery. The flat tip can also be used on flat or pointed shafts. Nickel-plated. 4.00
12698. **SPEED INDICATOR**, improved form, may be run at highest speed required without heating; dial plate has two rows of figures reading right or left; rubber tips for both pointed and centered shafts, which not only remove the jar and run smoothly, but produce a stronger frictional contact with the shaft. The rotating disc, being carried by friction, may be moved to the starting point where the raised knobs coincide. Pressing the raised knob on the rotating disc with the thumb prevents the disc from moving until the hand of the watch gets to the right position to take the time. Every hundred revolutions may be noted by feeling the knob pass under the thumb, thus relieving the eye which has only to look on the watch to note the time. Nickel-plated 1.25

See also **DE LAY STOP-WATCH AND REVOLUTION COUNTER** No. 12968.

SPINTHARISCOPE, see **Radioactivity Apparatus**.

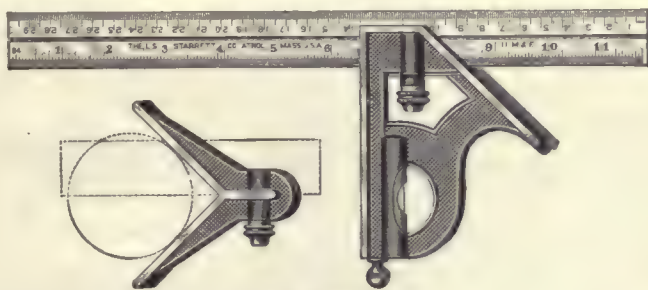
12714. **SPLINTS**, 100 in package.....per package .10
12718. **SPONGES**, for cleaning purposes, 16 to a poundper pound 2.00
12722. **SPOON, Aluminum**, table size, handle with ribbed center20
- SPOONS, Deflagrating**, see **Deflagrating Spoons**.
12730. **SPOON, Glass**, lamp blown, teaspoon..... .30
12731. **SPOON, Glass**, lamp blown, tablespoon..... .40
12734. **SPOONS, Horn**, plain form.
- | | | | |
|-----------------|-----|-----|-----|
| Length, mm..... | 100 | 150 | 200 |
| Each | .11 | .13 | .25 |
12736. **SPOONS, Horn**, with spatula end.
- | | | | |
|-----------------|-----|-----|-----|
| Length, mm..... | 100 | 150 | 200 |
| Each | .20 | .22 | .30 |
- SPOONS, Platinum**, see **Platinum Ware**.
12742. **SPOONS, Porcelain**, with spatula end.
- | | | | | | | | |
|-----------------|-----|-----|-----|-----|-----|-----|------|
| Length, mm..... | 96 | 120 | 140 | 160 | 200 | 247 | 490 |
| Each | .21 | .27 | .38 | .50 | .75 | .85 | 2.75 |
12744. **SPOON, Sodium**, of brass gauze, with cover and wooden handle..... .30
12746. **SPOON, Sodium, Capsule**, with ram-rod, according to Brownlee..... .25
12748. **SPOONS, Sodium**, cartridge shells, 8x13 mm insidePer dozen .10



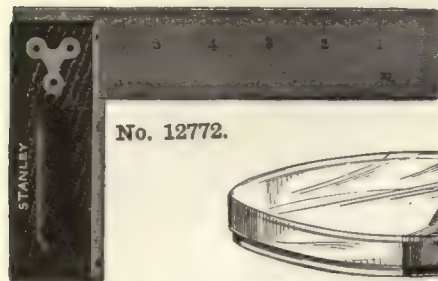
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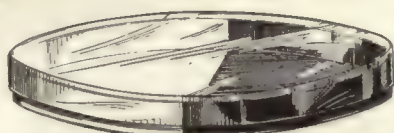
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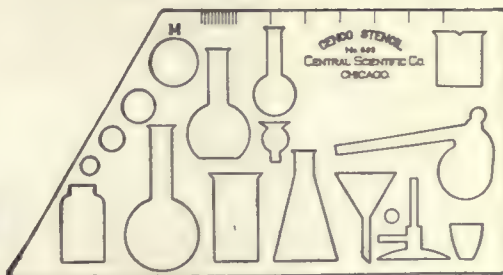
No. 12768.



No. 12772.



No. 12760.



No. 12790.



No. 12796.

SPRAYING MATERIAL, see Catalog A of Agricultural Apparatus.

SPRING BALANCES, see Balances.

12754. **SPRINKLER**, Rubber, bulb of extra quality, 8 ounce size, with straight neck..... \$1.00

12756. **SPRINKLER**, Rubber, same as No. 12754, but with bent neck..... 1.00

SPROUTING APPARATUS, see Grain Testing Apparatus.

SPUTUM BOTTLES, Square, see No. 2757.

12760. **SPUTUM DISH**, according to Webster, consisting of a 100 mm Petri dish with one half blackened50

12766. **SQUARE**, all steel, nicely polished, length 2 feet, width 2 inches, face marked in 4ths, 8ths, and 16ths of inches, back in 4ths and 12ths of inches, with board and brace measure.. 1.60

12768. **SQUARE, Combination**. The equivalent of a set of try squares, a depth gage, a level, a mitre, and, with the auxiliary center head, a centering square, both inside and outside. Convenient for transferring exact measurements, laying out work, or to square in a mortise. Twelve inch blade graduated on one side in $\frac{1}{2}$ mm and 32nds of inches; on the other in millimeters and 64ths of inches. Complete, with center head and level..... 3.00

12772. **SQUARES, Try**, blued steel blade graduated in 8ths of inches, and rosewood handle.

Size, inches	6	9
Each .....	.60	.70

STAGES, Mechanical, see Microscope Accessories.

STAGES, Warm, see Microscope Accessories.

12780. **STAINING APPARATUS**, Corper-DeKhotinsky, see next page.

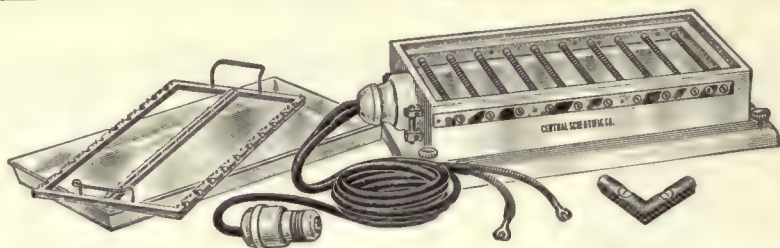
STAINING DISHES, see Dishes, Staining.

STAINING JARS, see Jars, Staining.

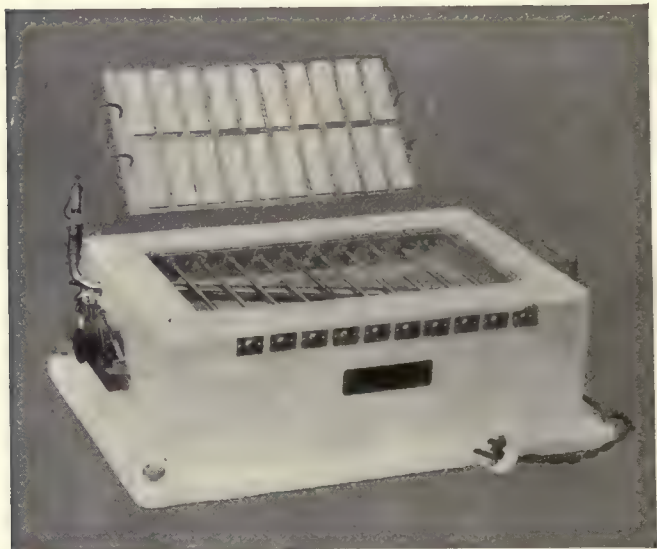
12790. **STENCIL**, Cenco, transparent, for quickly and easily drawing assembled apparatus in student note books10

12794. **STENCIL FIGURES**. Each figure has a beaded lock on its edge so that the figures can be joined together, permitting the use of combinations of figures at one time instead of single figures. Complete set of one-inch numbers from 0-9, dollar mark, cent mark, beginner, ender and period60

12796. **STENCIL LETTERS**. Same style as No. 12794. Complete set of one-inch letters from A to Z, with beginner and ender, period, apostrophe, comma and blank..... 1.25



Nos. 12780-1.



No. 12784. (Patent Pending.)

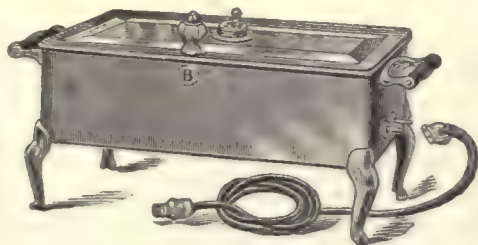
STAINING APPARATUS, Corper-DeKhotinsky, Electrically Heated, as used at the Municipal Tuberculosis Sanitarium of Chicago, a clean and neat device for hot staining and fixing. By its use it is possible to fix smears of sputum, etc., without danger of burning, to stain them without danger of boiling the carbol-fuchsin solution and also to avoid dropping carbol-fuchsin over the laboratory tables and floors. It consists of an asbestos wood frame with base which will stand red heat without destruction. In the bottom is a sliding metal shelf, to be filled with sand for catching any drippings and to aid in reflecting all the heat upward from the heating units, of which there is one for every two sides. These units, which are easily replaceable, are wound with nichrome wire, which is insoluble in boiling carbol-fuchsin. The slide carriers are nickel-plated brass frames made to fit in the asbestos frame at a suitable height above the electrical units. The base is provided with leveling screws. A set of fuses is placed on the apparatus, so that there is no danger from accidental short circuit. The apparatus is made in two sizes, as listed below, and is intended for standard 3x1 inch slides. It consists of heating box, slide carrier, tray, cross test level and five feet of asbestos covered cord and two plugs. Complete with rheostat for close regulation of heat. No. A B

12780.	For slides.....	10	20
12780.	For 110 volts.....	\$40.00	50.00
12781.	For 220 volts.....	41.00	51.00

12782.	SLIDE CARRIERS, extra, for Nos. 12780 and 12781.		
	No.	A	B
	For slides.....	10	20
	Each	3.25	4.00

12784. **STAINING APPARATUS, Corper-DeKhotinsky, Electrically Heated and Regulated** (Patent Pending), constructed for the same purpose as No. 12780, with the addition of the DeKhotinsky Automatic Thermo-Regulating System to facilitate maintaining a constant temperature, which is especially convenient in research work. In addition to its use in fixing and staining, it may be used as a hot plate for evaporating, concentrating, drying and boiling, etc. It is very economical in consumption of electrical energy, requiring only 180 watts to maintain a temperature of 180°C., over 82 square inches of surface of aluminum plate. For 20 slides. No. A B C D

No.	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	92.50	95.00	90.00	92.50
12785. SLIDE CARRIER , extra, for No. 12784.....				5.00



No. 12800.



Nos. 12806-7.



No. 12802.



Nos. 12810-11.

STERILIZERS, ALL KINDS

STERILIZERS, Autoclaves, see Autoclaves.

12800. **STERILIZER, Instrument, Electrically Heated, with three heats.** Made of heavy copper, nickel-plated and double tin lined with perforated tray. Provided with automatic cut-out which cuts off the current if the sterilizer should run dry. The hinged lid is provided with a ventilator which prevents dripping when opening the instrument. Operates on either A.C. or D.C. Current consumption on low heat, 125 watts; on high heat, 500 watts. Size, 10x4¼x2½ inches deep. Complete with five feet of attachment cord, connector, and lamp socket plug **\$24.00**

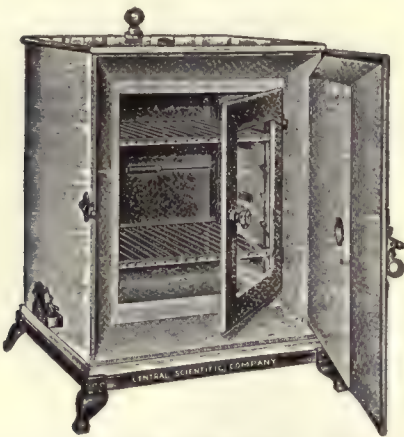
12802. **STERILIZER, Instrument, Lewis Form, with lifting tray, for sterilizing small instruments in pathological and bacteriological laboratories.** The tray carrying the instruments is raised clear of the hot water by opening the lid, and is held there until the lid is closed. Made of copper nickel-plated. Dimensions, 10x5x3 inches deep; total height closed, 6 inches. Complete with burner and base as illustrated **21.00**

STERILIZER, Combination Instrument and Dressing, with control valve, for sterilizing instruments and dressings. Consists of a double walled chamber resting on a removable base which is used to contain water for generating steam. The steam passes between the double walls and after the contents of the inner chamber have become heated to 212°F., the live steam is admitted by a control valve at the top and forced through the contents and out at the bottom of the other end. When sterilization is completed, the steam is again cut off and the contents are left in the chamber until thoroughly dried. The base can be used separately with the cover and one rack as an instrument sterilizer. Complete with two wire cloth racks and valve opening for thermometer.

No.	A	B
Length, inches.....	14	18
Width, inches.....	6	7½
Depth, inches.....	6	8
12806. Made of heavy tin, copper bottom.....	9.50	12.00
12807. Made of polished copper, tin lined.....	19.50	26.00

STERILIZER, Combination Instrument and Dressing, Electrically Heated, of polished copper, tin lined, same as No. 12807, but with Prometheus electric heater mounted in the base. Can be attached to any lamp socket. Complete with three-heat plugs, attachment cord and plug.

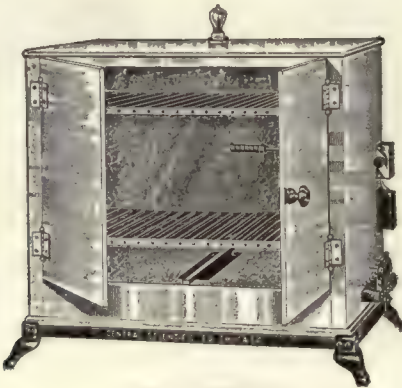
No.	A	B
Length, inches.....	14	18
12810. For 110 volts.....	38.00	53.50
12811. For 220 volts.....	38.00	53.50



Nos. 12816-17.



Nos. 12820-21.



Nos. 12822-23.

STERILIZERS, Hot Air, DeKhotinsky Electrically Heated and Regulated, Triple Wall, constructed to secure uniformity of temperature throughout heated chamber and dependable temperature regulation. Provided with the DeKhotinsky standard system of heating, bi-metallic thermo-regulator for temperatures up to 160°C., and with inner glass door for observation of contents. Complete with five feet of cord, Hubbell receptacle and separable Hubbell plug for attachment to any lamp socket.

No.		A	B	C
Inside dimensions, inches.....		10 ⁵ / ₈ x7x6 ¹ / ₂	14 ³ / ₄ x12x11 ³ / ₄	19 ³ / ₄ x17x14
Shelf space, square inches.....		91	282	476
12816.	For 110 volts A.C. and D.C.....	\$55.00	90.00	145.00
12817.	For 220 volts A.C. and D.C.....	57.50	92.50	147.50

For full description of construction, heating and ventilating system and temperature control, see No. 9830 Drying Ovens.

For **EXTRA FUSES** for Nos. 12816-7, see No. 9838.

STERILIZERS, Hot Air, DeKhotinsky Electrically Heated and Regulated, Single Wall, designed to supply the need for a moderate priced sterilizer with dependable temperature control and uniform temperature throughout. With same system of heating and temperature control as No. 12816, but of simpler construction. For full description, see No. 9846 Drying Ovens.

	Width, Inches	Depth, Inches	Height, Inches	Vol. Inside, Cu. Inches	Shelf Space, Sq. Inches	Voltage A.C. & D.C.	Price
12820.	11	10	12	1320	220	110	40.00
12821.	11	10	12	1320	220	220	42.50

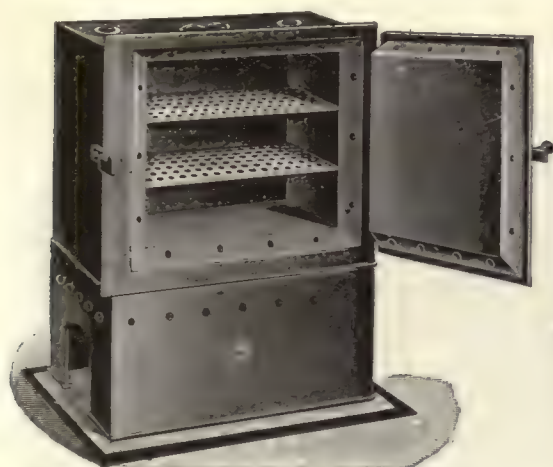
STERILIZERS, Hot Air, DeKhotinsky Electrically Heated and Regulated, Single Wall, of same construction as No. 12820, but larger, with two doors and with twelve 115 watt heating units.

With same equipment as No. 12820.

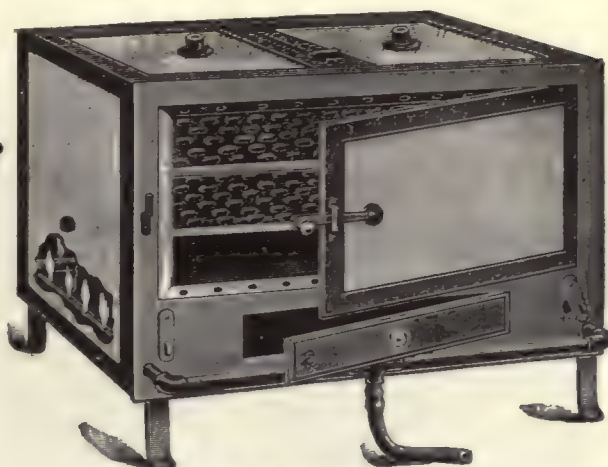
	Width, Inches	Depth, Inches	Height, Inches	Vol. Inside Cu. Inches	Shelf Space, Sq. Inches	Voltage A.C. & D.C.	Price
12822.	18	12	14	3024	430	110	60.00
12823.	18	12	14	3024	430	220	62.50

For **EXTRA FUSES** for Nos. 12820-3, see No. 9850.

For **EXTRA HEATING UNITS** for Nos. 12816-23, see Nos. 7526-7.



No. 12826.



No. 12828.



No. 12830.

12826. **STERILIZERS, Hot Air, Double Wall**, of sheet iron, with enclosed base, asbestos mat, and perforated shelves. Without burner.

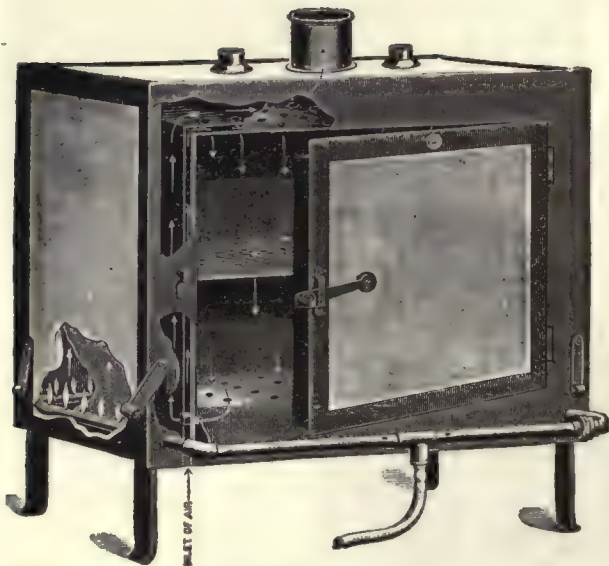
No.	A	B
Height inside, inches.....	9	10
Width inside, inches.....	9	12
Depth inside, inches.....	6	10
Height over all, inches.....	19½	21½
Number of shelves.....	1	2
Each	\$13.00	21.50

For **BURNERS** for use with No. 12826, see Nos. 2108 and 2220.

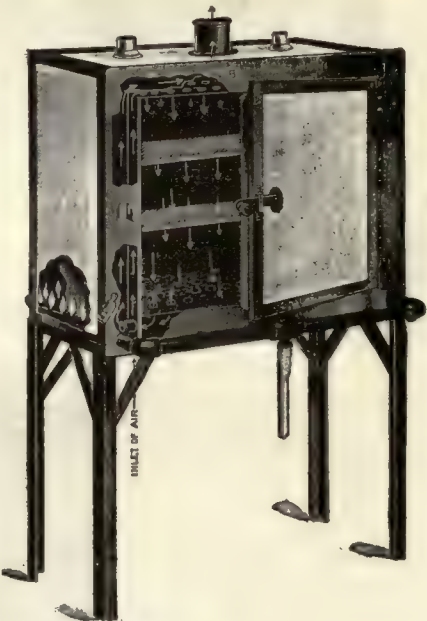
12828. **STERILIZERS, Hot Air, Low Form**, for gas only, double walled, made of sheet iron covered with asbestos. The instrument is heated by a row of small Bunsen burners around the sides of the base, insuring an even circulation of heat. The air is introduced through openings in the sides. With two shelves, ventilator in top and tubulations for thermometer and gas regulator. Without thermometer or gas regulator.

No.	A	B
Height inside, inches.....	12	18
Width inside, inches.....	24	24
Depth inside, inches.....	12	14
Each	45.00	57.00

12830. **STERILIZER, Hot Air, High Form**, similar in construction to No. 12828, but tall and narrow in shape. Height inside, 19 inches; width inside, 12 inches; depth inside, 9½ inches. With three perforated shelves..... 33.00



Nos. 12834-6.



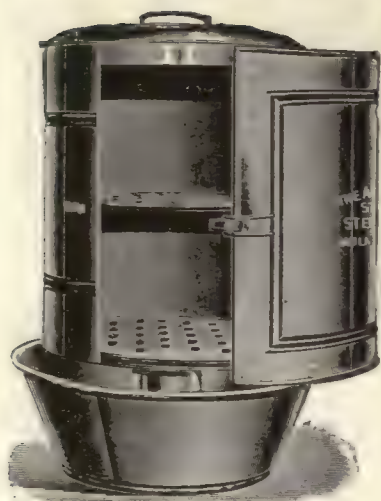
Nos. 12840-2.

STERILIZERS, Hot Air, Lautenschlaeger Form, of Russia iron, covered with asbestos. This sterilizer has three walls, providing two air spaces through which currents of air, heated (when provided with burners for gas) by a row of small Bunsen burners between the outer walls, pass continuously. An even temperature is thereby maintained. They can be heated to 150°C., in about 5 minutes. Without thermo-regulator or thermometer.

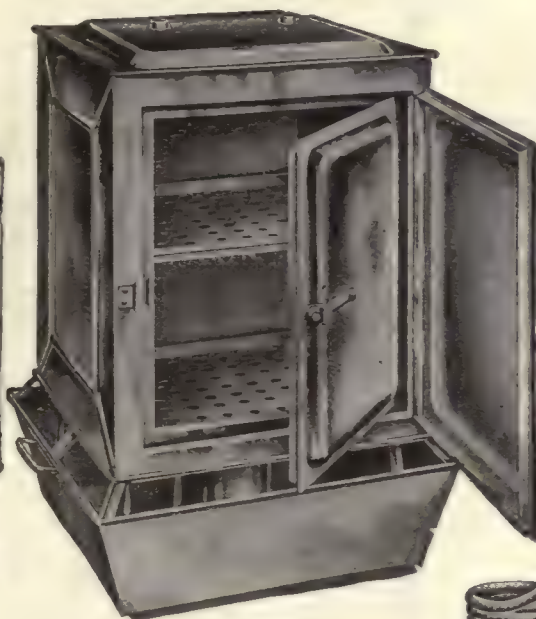
No.	A	B	C	D
Height inside, inches.....	12	18	24	30
Width inside, inches.....	18	24	30	36
Depth inside, inches.....	9	14	18	20
Number of shelves.....	1	2	3	3
12834. With gas heater.....	\$ 48.00	62.00	108.00	150.00
12835. With oil heater.....	90.00	123.00	190.00	247.50
12836. With electric heater.....	122.50	165.00	275.00	330.00

STERILIZERS, Hot Air, Lautenschlaeger Form, same as No. 12834, but mounted on stand 24 inches high.

No.	A	B
Height inside, inches.....	24	30
Width inside, inches.....	30	36
Depth inside, inches.....	18	20
Number of shelves.....	3	3
12840. With gas heater.....	121.00	158.50
12841. With oil heater.....	203.00	261.00
12842. With electric heater.....	288.00	345.00



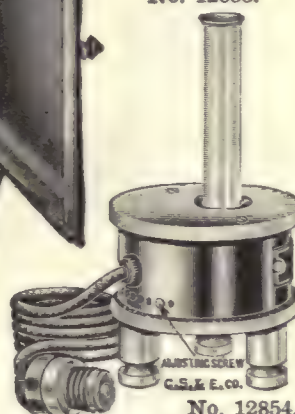
Nos. 12846-7.



No. 12850.



No. 12855.



No. 12854.

STERILIZERS, Arnold Steam, with side door and two removable perforated disks. These sterilizers are well known for their compactness and economy. They maintain the unvarying temperature of boiling water in all parts of the sterilizing chamber.

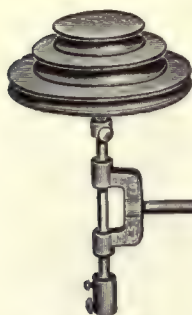
No.	A	B	C	D
Height, inches.....	7 $\frac{1}{8}$	10 $\frac{3}{8}$	11 $\frac{3}{4}$	12 $\frac{1}{2}$
Diameter, inches.....	8 $\frac{1}{2}$	9	10 $\frac{1}{2}$	10 $\frac{3}{8}$
Made of heavy tin, copper bottom.....	\$6.25	7.25	8.75	9.75
Made of copper.....	14.50	20.00	23.00	24.75

12850. STERILIZERS, Arnold Steam, Boston Board of Health Pattern. Made of copper throughout with double walls and doors, and with two removable wire cloth trays.

No.	A	B
Height inside, inches.....	14 $\frac{3}{4}$	15 $\frac{3}{4}$
Width inside, inches.....	8 $\frac{3}{4}$	12 $\frac{1}{4}$
Depth inside, inches.....	9	12 $\frac{1}{4}$
Each	55.00	60.00

12854. STERILIZER, Test Tube, Electric, consisting of a small cylindrical drum, 2 $\frac{1}{4}$ x3 $\frac{1}{2}$ inches, having a nickel-plated metal body with a top and bottom of $\frac{1}{4}$ -inch transite, mounted upon three legs. Near the center is a metal cylinder 1 $\frac{1}{16}$ inches in diameter and 1 $\frac{1}{2}$ inches in depth, surrounded by a resistance coil which heats its entire surface uniformly and quickly. The heating unit is controlled by an automatic electro thermo-regulator, contained within the drum, adjusted by means of a screw reached by a small screw driver. The thermo-regulator completely controls the temperature so that the contents of the test tube may be brought to the boiling point without boiling over. Metal rings are provided for the receptacle, permitting the use of $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ and 1-inch test tubes. Complete including test tube and small crucible, as illustrated..... 15.00

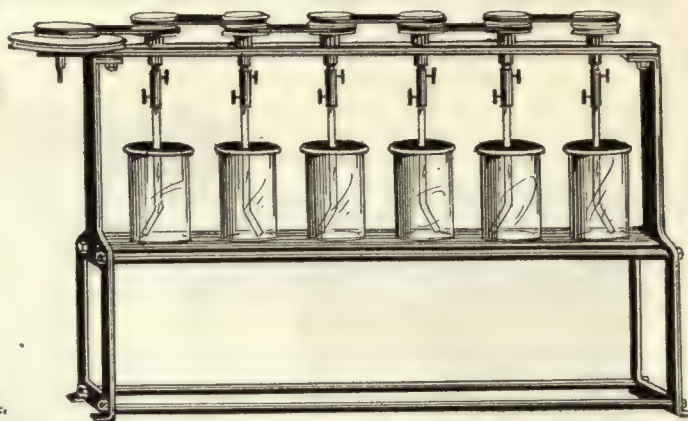
12855. STERILIZER ATTACHMENT, for use with No. 12854, for sterilizing hypodermic syringes, needles, etc. Constructed of metal, nicely finished and polished, arranged to fit into the heating tube of No. 12854. Dimensions of the sterilizer are: diameter, 3 $\frac{1}{4}$ inches; depth, $\frac{7}{8}$ inch. The wire basket can be removed by means of an adjustable wire tongs, which fits into loops shown on wire basket. Similar loops are attached to the body of the sterilizer so that the entire apparatus may be easily removed from heated receptacle (the loops on sterilizers are not shown in cut.) A nest of four test tubes is furnished with the sterilizer, the largest one (1 inch in diameter) having a cork disk in the bottom to protect the point of scalpel. This outfit in connection with No. 12854 makes an ideal small sterilizer for hypodermic syringes and needles, as well as catheters, probes, scalpels, etc. Complete as illustrated 7.50



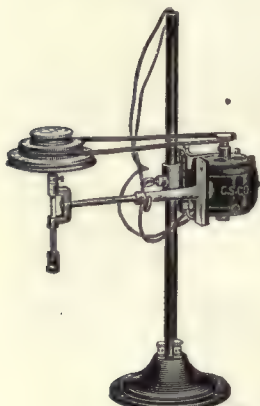
No. 12866.



No. 12864.



No. 12872.



No. 5156.



A



B



C



D



E

No. 12868.



No. 12882.

STIRRING APPARATUS

12864. **STIRRERS, High Speed Turbine**, for use in water baths, etc., where rapid stirring must be maintained. They are compact and efficient, operating without noise or violent disturbance of the water. Especially adapted for use in thermostats, in physical chemistry laboratories.

No.	A	B	C
Length, inches.....	8	10	12
Diameter, inches.....	$\frac{7}{8}$	$\frac{7}{8}$	$1\frac{1}{4}$
Capacity, liters per minute.....	5	5	8
Power required to operate, h. p.....	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{12}$
Each	\$6.00	6.50	7.00

12866. **STIRRING APPARATUS**, consisting of a three step cone pulley with chuck for holding glass stirring rods, mounted in bracket with rod for attachment to support stand. Diameter of largest pulley, $3\frac{1}{2}$ inches. For rods up to $\frac{1}{4}$ inch..... 4.00

12868. **STIRRING RODS**, of glass for use with No. 12866.

Style	A	B	C	D	E
Each .....	.80	.80	1.25	1.00	.80

12872. **STIRRING APPARATUS, Blair's**, as used in iron analysis. Complete with stirrers, asbestos plate, 6 beakers and covers, without motor..... 20.00

5156. **STIRRING APPARATUS, Electric**, with adjustable bracket, spindle with chuck to hold stirring rods, and three step pulley. Diameter of largest pulley, $3\frac{1}{2}$ inches. A rheostat is provided for controlling the speed. For rods up to $\frac{1}{4}$ inch. No.

	A	B	C	D
	A.C.		D.C.	
For volts.....	110	220	110	220
Each	27.50	31.50	27.50	31.50

STIRRING RODS, see Glass Rods.

STILLS, see Distilling Apparatus.

STOP-COCKS, ALL KINDS

12880. **STOP-COCKS, Brass**, for gas, nickel-plated, with long taper hose end for $\frac{1}{4}$ to $\frac{3}{8}$ inch rubber tubing; male thread for attaching to gas pipe coupling. Not for water.

	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Diameter of gas pipe inside, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Size of I. P. thread, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Each .....	.40	.50	.60

12882. **STOP-COCKS, Brass**, for gas, same as No. 12880, but with female thread for attaching to gas pipe.

	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Diameter of gas pipe inside, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Size of I. P. thread, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Each .....	.40	.50	.60



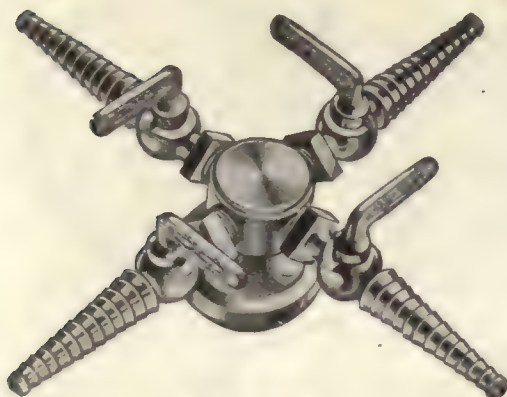
No. 12884.



No. 12900.



No. 12893.



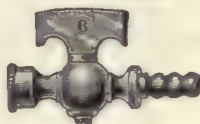
No. 12886.



No. 12892.



No. 12894.



No. 12896.



No. 12895.



No. 12897.



No. 12890.

No. 12891.

No. 12910.



No. 12908.



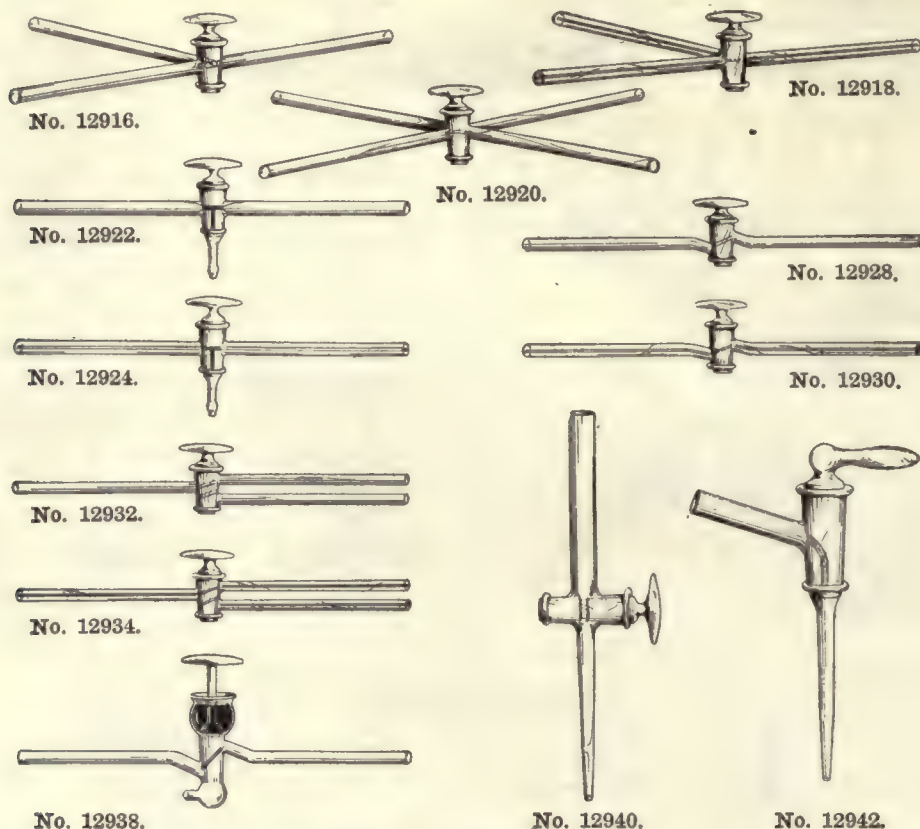
No. 12912.

12884. **STOP-COCK**, Brass, for gas, single, nickel-plated. Especially suited for laboratory use. The nipple is $2\frac{1}{2}$ inches long, tapering from $\frac{5}{8}$ inch diameter at the valve to $\frac{1}{4}$ inch diameter at the end. The serrations prevent rubber tubing from slipping off. With $\frac{3}{8}$ inch iron pipe male thread \$0.60
12885. **STOP-COCK**, Brass, two-way, consisting of two No. 12884 Single Stop-Cocks, with flange. 2.50
12886. **STOP-COCK**, Brass, four-way, consisting of four No. 12884 Single Stop-Cocks, with flange. 4.00

STOP-COCKS AND NIPPLES FOR AIR PUMPS.

The following nipples and stop-cocks are accurately made of brass, polished and lacquered, and in order that they may be capable of the greatest service in the laboratory we have not threaded them for use with iron pipe fittings, but have used the same threads as are used on all our Air Pump Plates and Air Pump Accessories ($\frac{7}{16}$ -inch in diameter and 16 threads to the inch). Stop-cocks are $\frac{1}{8}$ inch bore; nipples, $\frac{3}{16}$ inch bore.

12890.	NIPPLE , of brass, female screw.....					.40
12891.	NIPPLE , of brass, male screw.....					.40
12892.	STOP-COCK , double male screw.....					.60
12893.	STOP-COCK , one end for tubing, the other with male screw.....					.60
12894.	STOP-COCK , both ends for tubing.....					.60
12895.	STOP-COCK , one male and one female screw .....					.80
12896.	STOP-COCK , one end for tubing, the other with female screw.....					.80
12897.	STOP-COCK , both ends with female screws.....					1.00
12900.	STOPCOCK , Brass, for No. 6720 Gas Bags. One end for attaching rubber tubing, the other a $\frac{5}{8} \times 2\frac{1}{2}$ -inch brass tube for nozzle of gas bag .....					.90
12908.	STOP-COCKS , Glass, straight.					
	Bore, mm.....	1	2	3	4	5
	Each	1.25	1.38	1.75	2.00	2.25
12910.	STOP-COCKS , Glass, same as No. 12908, with curved outlet for aspirator bottles, etc.					
	Bore, mm	1	2	3	4	5
	Each	1.50	1.65	2.00	2.25	2.50
12912.	STOP-COCKS , Glass, same as No. 12908, but with capillary tubes for use in gas analysis apparatus, etc. Outside diameter of tube, 6 to 7 mm.					
	Bore of stopper, mm.....			1	2	
	Each			1.40	1.50	



12916. STOP-COCKS, Glass, three-way lamp blown form.			
Bore of stopper, mm.....	1	2	4
Each	\$1.80	2.00	2.75
12918. STOP-COCK, Glass, same as No. 12916, but with capillary tubes. Bore of stopper, 2 mm			2.25
12920. STOP-COCK, Glass, four-way. Bore of stopper, 2 mm.....			2.50
12922. STOP-COCKS, Glass, three-way, with downward outlet through stop-cock plug.			
Bore of stopper, mm.....		1	2
Each		2.65	2.75
12924. STOP-COCKS, Glass, three-way, same as No. 12922, but with capillary tubes.			
Bore of stopper, mm.....		1	2
Each		3.00	3.15
12928. STOP-COCK, Glass, two-way, with plug bored at an angle. Bore of stopper, 2 mm.....			1.75
12930. STOP-COCK, Glass, two-way, same as No. 12928, but with capillary tubes. Bore of stopper, 2 mm			2.15
12932. STOP-COCKS, Glass, three-way, with plug with two holes bored at an angle, and with two outlets on one side.			
Bore of stopper, mm.....		2	4
Each		2.50	4.40
12934. STOP-COCKS, Glass, three-way, same as No. 12932, but with capillary tubes. Bore of stopper, 2 mm			3.00
12938. STOP-COCKS, Glass, two-way, with mercury seal, and plug bored at an angle.			
Bore of stopper, mm.....		2	4
Each		4.00	5.50
12940. STOP-COCKS, Glass, Burette, with outlet drawn to a tip, for attaching to burettes.			
Bore of stopper, mm.....		1	2
Each		1.40	1.50
12942. STOP-COCK, Glass, Presenius form, for burette tips. With inlet tube bore, 5 mm; outlet bore, 2 mm			1.20
12946. STOP-COCK GREASE, for lubricating and preventing leakage. Heavier and more resistant to reagents than vaseline.....			per ounce bottle .25



No. 12954.



No. 12956.



No. 12962.

STOP-WATCHES

FOR TIMING A SINGLE PERFORMANCE.

12954. **STOP-WATCH, Ordinary Design.** Nickeled case, stem wind, lever escapement, $\frac{1}{5}$ second divisions. Convenient for testing and experimental work, being non-magnetic. \$11.00
12956. **STOP-WATCH, Decimal Design.** The minute is divided into 100 parts so that the watch is very useful in all timing operations in which the minute is the unit of time. Readable to $\frac{1}{5}$ of a division, i. e., $\frac{1}{300}$ minute. Otherwise same as No. 12954 described above. 11.00

FOR TIMING TWO EVENTS WHICH START SIMULTANEOUSLY BUT END AT DIFFERENT TIMES.

12960. **STOP-WATCH.** Nickeled case, stem wind, lever escapement, $\frac{1}{5}$ second divisions, non-magnetic, provided with two hands for timing two events which start simultaneously but end at different times. Useful in timing laboratory operations, and in timing first and second places in a race. Has a higher grade movement than No. 12954 25.00

FOR TIMING AN INTERRUPTED PERFORMANCE.

12962. **STOP-WATCH.** Nickeled case, stem wind, lever escapement, 7 jewels, $\frac{1}{5}$ second divisions, non-magnetic. This watch is operated by moving a "side piece" instead of pushing the "crown." This method is easier on the mechanism, giving the watch much longer life. It also operates more smoothly than the old style and will record the time of an interrupted performance, giving exactly the time used for the performance itself, **excluding the interruption.** The hands will come back to their original starting point only by pushing the "crown"..... 12.50
12966. **STOP-WATCH, DeLay, Electrically Operated.** A high grade American made stop-watch, with an electromagnet attachment by means of which the starting and stopping of the watch may be accomplished.

The watch is a seven jewel movement in a nickeled case. A chronometer with stop-watch attachment is used, as this type of stop-watch is more rugged and reliable. The chronometer is a good time keeper and the electromagnet attachment does not in any way interfere with the use of the watch as a time keeper or as an ordinary stop-watch.

This device is very useful in many laboratory experiments, such as the accurate determination of the velocity of moving bodies and the timing of various operations by automatically opening and closing the electric circuit.



Nos. 12966-8.

STOP-WATCH, DeLay, continued.

The speed of rotating shafts can be determined by using this stop-watch in connection with a special revolution counter (see No. 12968 below). Great accuracy is obtained because of the fact that both the revolution counter and stop-watch are started and stopped simultaneously and are in positive connection through an electric circuit. A small flash light battery gives sufficient power for operating this stop-watch \$20.00

- 12968. STOP-WATCH and REVOLUTION COUNTER, DeLay.** An accurate and reliable revolution counting device. This device consists of No. 12966 Electrically Operated Stop-watch and a special revolution counter, connected together in such a manner that the time taken to make any number of revolutions may be accurately determined. The starting and stopping of the watch is simultaneous with the starting and stopping of the speed counter. No error can possibly enter in. This device is easily more accurate than any other speed counter on the market.

The revolution counter is the best worm gear counter made and is equipped with a small special attachment for this work. This attachment does not interfere with the use of the counter in the ordinary manner, and it can be used for either direction of rotation. A battery of the pocket flash-light type is used to operate the device.

To use the device, the circuit is first closed, which places the watch under electrical control. The stem is then pressed, which releases the hand mechanically. Placing the rubber tip of the counter in the shaft center opens the watch circuit and starts the long second hand. The stop-watch continues to run until the speed counter is removed from the shaft, when the electric circuit is again closed, stopping the second hand. Pressing the stem of the watch holds the hand mechanically so that the electric circuit may be opened. After the reading of both instruments has been taken, the indicators may be returned to zero and it is then ready for the next reading. The revolutions may be taken for any number of seconds or the time for any number of revolutions accurately determined. When great accuracy is desired a curve may be plotted from which accurate readings may be taken for fractions of a second.

Watch and Revolution Counter complete..... 30.00

- 12969. REVOLUTION COUNTER only, of No. 12968, with battery and cords..... 10.00**

STORAGE TANKS, see Jars.

STOVES, see Burners.

- 12974. STRAIGHT EDGE, cherry, one edge beveled; 24-inch35**

For **T-SQUARES**, see general heading **Drawing Instruments.**

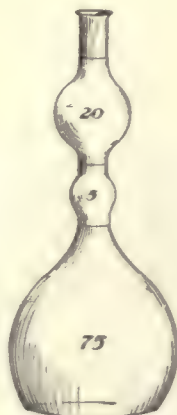
STREAK PLATES, see Arsenic Plates.

STROPS, Razor, see Microtome Accessories.

SUBERITE RINGS, see Cork Rings.



No. 12982.



No. 12988.



No. 13002.



No. 10486. No. 10510.



No. 13010.

SUGAR ANALYSIS APPARATUS

BEAKERS, Copper, see general heading **Beakers**.

BEAKERS, Glass, see general headings, **Beakers**.

12982. **BEAKER, Digestion**, for determining sucrose in beets by the Herzfeld modification of the Sachs Le Docte method. Made of nickel-plated copper 14 cm high, 6 cm in body diameter, and 4 cm in diameter at the top. Complete with selected cork stopper covered with tin foil. (See Journal of the Association of Official Agricultural Chemists, Vol. II, No. 1, Part II, page 81) \$4.00

CRUCIBLE, Alundum Filtering, see general heading **Crucibles**.

CRUCIBLE HOLDERS, see Nos. 3446 and 3448.

CRUCIBLES, Gooch. Opaque Fused Silica, see general heading **Crucibles**.

DISHES, Lead, Bottle Caps, see general heading **Dishes**.

FLASKS, Volumetric Sugar, see general heading **Flasks**.

12988. **FLASK, Spencer Inversion**, for use in inverting sugar for polarization, with three marks dividing the total 100 cc capacity into 75, 5 and 20 cc divisions..... 1.25

FUNNELS, Sugar, see general heading **Funnels**.

13002. **HORTVET TUBE**, for determining the lead number of maple products, etc., for use in a centrifuge. Length of tube, 15.2 cm; diameter of wide part, 3 cm; diameter of neck, 2 cm; stem graduated to 5 cc in $\frac{1}{10}$ cc divisions, with 5 cc line 5 mm below beginning of wide part. With etched spot to facilitate numbering..... .80

HYDROMETERS, Brix, see general heading **Hydrometers**.

MUFFLE FURNACE, see general heading **Furnaces**.

OVEN, Vacuum, see general heading **Ovens**.

10486. **PIPETTE, Spencer's Glucose**, capacity 50 cc, graduated from 5° to 20° Brix in $\frac{1}{5}^\circ$ divisions 2.00

10510. **PIPETTE, Sucrose**, capacity 52.096 cc, graduated from 5° to 25° Brix in $\frac{1}{10}^\circ$ divisions.. 2.50

PLATINUM SUGAR DISHES, see general heading **Platinum Ware**.

POLARISCOPES, see general heading **Polariscopes**.

PYCNOMETERS, see **Bottles, Specific Gravity**.

REFRACTOMETERS, see general heading **Refractometers**.

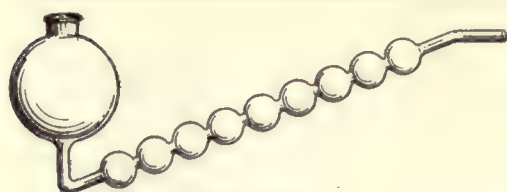
ROEHRIG TUBES, see general heading **Extraction Apparatus**.

WEIGHING DISH and COUNTERPOISE, see general heading **Balances**.

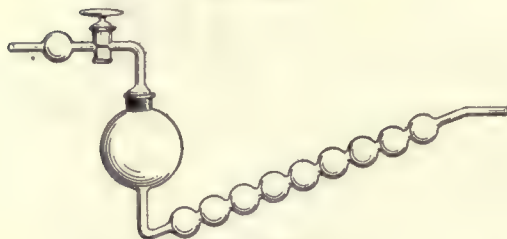
WEIGHTS, Normal Sugar, see general heading **Balances**.

SULPHUR DETERMINATION APPARATUS

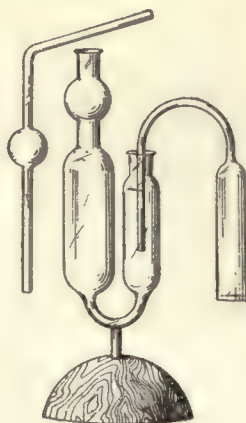
13010. **SULPHUR APPARATUS, Dudley's Improved**, for the determination of sulphur in iron by the bromine method. Mounted on iron support as illustrated 15.00
13011. **SULPHUR APPARATUS, Dudley's**, glass parts only of No. 13010..... 12.00



No. 13014.



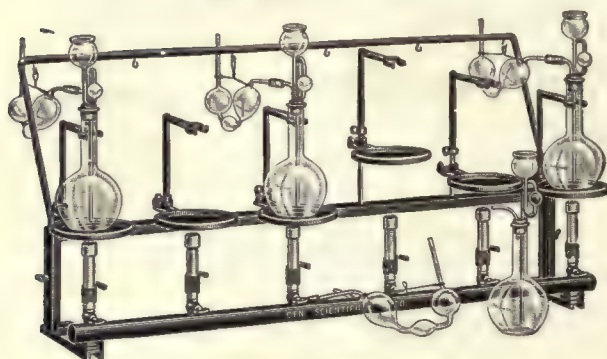
No. 13016.



No. 13020.



No. 13024.



No. 13028.



No. 5732.



No. 13032.

13014. **SULPHUR APPARATUS, Meyer's**, for the determination of sulphur in iron and steel by the bromine method.

No.	A	B
Number of bulbs.....	6	10
Each	\$1.50	2.00

13016. **SULPHUR APPARATUS, Meyer's**, same as No. 13014, but with stop-cock ground to fit bulb.

No.	A	B
Number of bulbs.....	6	10
Each	4.00	4.50

13020. **SULPHUR APPARATUS**, for the determination of sulphur in oils, consisting of three glass parts with wooden base..... 3.00

13024. **SULPHUR APPARATUS, Norris**, for the determination of sulphur in iron and steel. Complete as illustrated 3.50

3141. **SULPHUR BULB** only of No. 13024..... .70

SULPHUR PHOTOMETER, Parr's, see No. 2378.

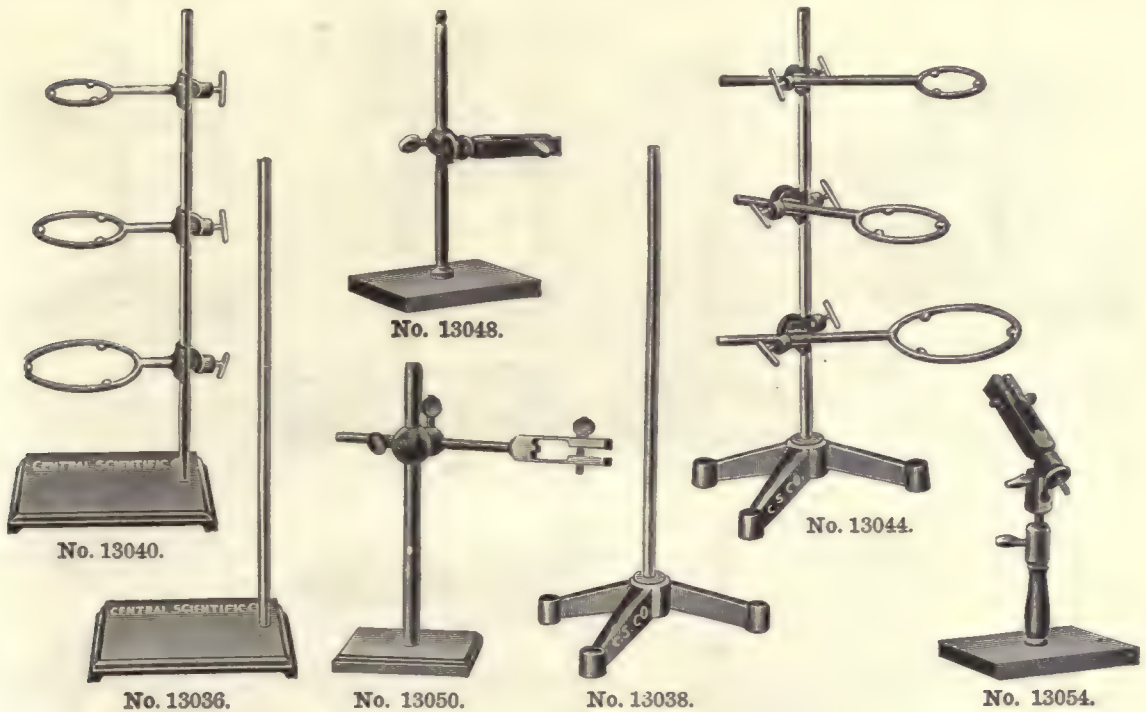
13028. **SULPHUR RACK, Illinois Steel Company Form**, consisting of an iron stand with a row of high temperature burners with individual stop-cocks, and with adjustable flask supports and clamps. A rack is provided with hooks to support sulphur bulbs. Without glassware..... 35.00

5732. **SULPHUR APPARATUS**, for determining whether grain has been bleached, as recommended in Circular No. 111 of the United States Bureau of Plant Industry. Consists of an Erlenmeyer flask with ground in connecting tube. Capacity, 500 cc..... 1.95

SULPHUR APPARATUS, Pennock and Martin, see general heading **Crucibles**.

13032. **SUNSHINE RECORDER**. This instrument records the duration and intensity of sunshine for twenty-four hours on a specially prepared photographic chart, which merely requires washing in cold water to become permanent. The chart being divided into hours, an exact record is thus obtained with the minimum of trouble. Complete with divided arc for adjustment of instrument to any latitude, with 100 charts and directions for use..... 25.00

13033. **EXTRA CHARTS** for No. 13032.....Per 100 3.50



SUPPORTS, ALL KINDS

13036. SUPPORTS, Iron, rectangular base, with coppered steel rod.

No.	A	B	C	D
Size of base, inches.....	4x6 $\frac{3}{4}$	5x8	5 $\frac{1}{2}$ x9	6x11
Length of rod, inches.....	18	20	24	36
Diameter of rod, inches.....	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Each	\$0.45	.60	.80	1.70

13038. SUPPORTS, Iron, tripod base, with coppered steel rod.

No.	A	B	C	D
Length of leg, inches.....	4 $\frac{1}{4}$	5 $\frac{1}{2}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$
Length of rod, inches.....	18	20	24	36
Diameter of rod, inches.....	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Each .....	.50	.65	.90	1.75

13040. SUPPORTS, Iron, rectangular base, consisting of Support No. 13036, with Rings No. 11502.

No.	A	B	C	D
Number of rings.....	2	3	4	4
Diameter of rings outside, inches.....	3.4	3.4, 5	3.4, 5, 6	3.4, 5, 7
Each .....	.85	1.25	1.65	2.40

13042. SUPPORTS, Iron, tripod base, consisting of Support No. 13038 with Rings No. 11502.

No.	A	B	C	D
Number of rings.....	2	3	4	4
Diameter of rings outside, inches.....	3.4	3.4, 5	3.4, 5, 6	3.4, 5, 7
Each .....	.90	1.35	1.80	2.50

13044. SUPPORT, Iron, tripod base, consisting of No. 13038B, with one each Extension Rings No. 11504, 3, 4 and 5 inches, and 3 No. 2914 Clamp Holders. Complete as illustrated..... 2.20

13048. SUPPORT, Hardwood, Gay-Lussac's, with clamp cork lined, adjustable in three directions. Length of upright rod, 16 inches..... 1.40

13050. SUPPORT, Hardwood. Improved form of Gay-Lussac's, with clamp on a $\frac{1}{2}$ -inch extension rod, 10 inches long 1.50

13051. WOODEN CLAMP only of No. 13050, for use with clamp holders, etc., in connection with iron supports80

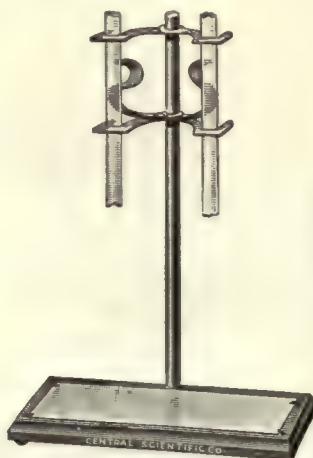
13054. SUPPORT, Hardwood, Schellbach's. Clamp cork lined, universal movement..... 1.70



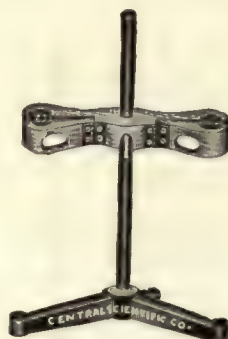
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No. 13064.



No. 13072.



No. 13078.



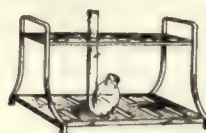
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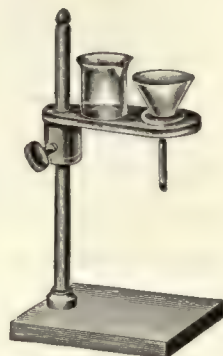
No. 13076.



No. 2248.



No. 5292.



No. 13094 (in use).

13058. **SUPPORT, Burette, hardwood, with cork-lined clamp, for one burette. Length of rod, 16 inches** \$0.90
13060. **SUPPORT, Burette, hardwood, same as No. 13058, but for two burettes**..... 1.25
13064. **SUPPORT, Burette, Hardwood, round base, with nickel-plated steel rod, 22x $\frac{5}{16}$ inches, and revolving spring clamps for four burettes. Adjustable in height**..... 4.50
13072. **SUPPORT, Burette, hardwood, Chaddock's, improved form. The rod and base are of polished hardwood. On top of the base is a rectangular piece of white glass. The clamp is of spring brass, which holds the burette firmly in place without danger of breakage. The burette is readily placed in position or removed by simply pushing back the brass spring. For two burettes** 3.00
13076. **SUPPORT, Burette, Iron, consisting of Support No. 13036B, with Clamp No. 2842**..... 1.00
13078. **SUPPORT, Burette, Iron, consisting of Support No. 13038B, with cork-lined hardwood clamp for two burettes**..... 2.50
2248. **SUPPORTS, Burner, Iron, with flat top and heavy screw for attachment to support stand. Useful for supporting burners and many other laboratory devices.**
- | | | |
|-----------------------|-----------------|-----|
| No. | A | B |
| Diameter, inches..... | 3 $\frac{1}{2}$ | 5 |
| Each | .25 | .60 |
10286. **SUPPORT, Conductivity, for use in thermostats for holding flasks, calomel electrodes, etc. Heavy base of white metal with rod and clamp of brass, nickel-plated**..... 2.75
- SUPPORTS, Electrolytic, see Electrolytic Apparatus.**
5292. **SUPPORT, Fermentation Tube, copper, for 10 tubes, without foot, as No. 5280**..... 1.60
13094. **SUPPORT, Funnel, hardwood, for one funnel, with arm large enough to accommodate beakers. Height of rod, 16 inches**..... .80



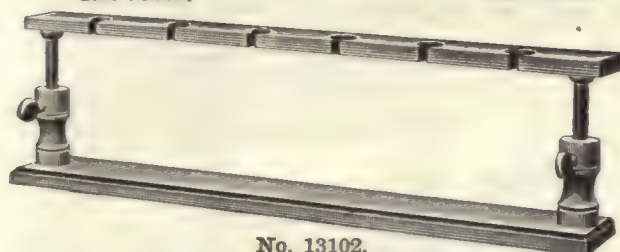
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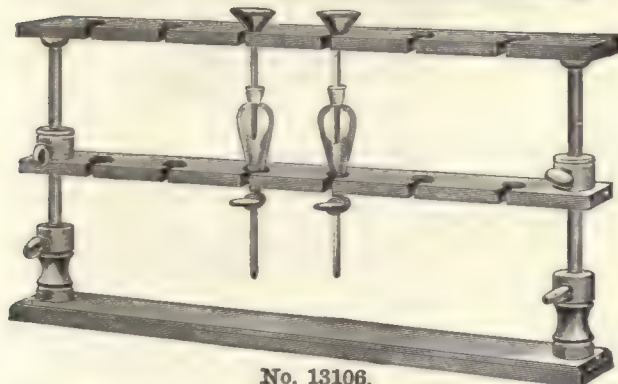
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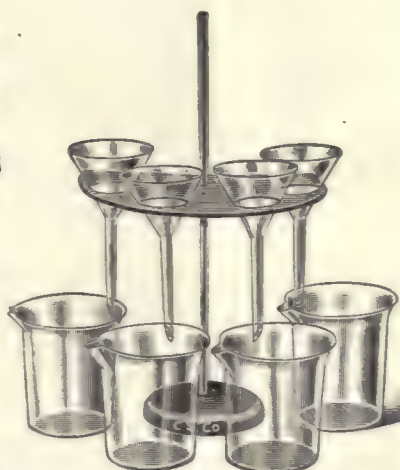
No. 13100 (mounted).



No. 13102.



No. 13106.



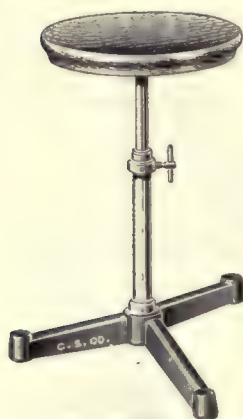
No. 13110.



No. 13122.

13096. **SUPPORT, Funnel, hardwood, for two funnels** \$0.75
13098. **SUPPORT, Funnel, hardwood, similar to No. 13096, but for four funnels, and with holes slotted enabling funnels to be removed from the side**80
13100. **SUPPORT, Funnel, hardwood, with iron clamp for attachment to support stand. With slotted holes for four funnels. Without support stand**45
13102. **SUPPORTS, Funnel, hardwood, improved form, with slotted holes. Adjustable in height from 7½ to 12 inches.**
- | | | |
|-------------------|------|------|
| No. | A | B |
| For funnels | 6 | 12 |
| Each | 4.00 | 8.00 |
13106. **SUPPORT, Funnel, hardwood, Leach, for separatory funnels. Both bars adjustable in height. For six funnels** 7.00
13110. **SUPPORT, Funnel, Stoddard's Aluminum, with set screw for use with No. 13113 Base and Rod. For four 2 inch funnels.** 1.20
13112. **SUPPORT, Funnel, Stoddard's Aluminum, same as No. 13110, but for four 2½ inch funnels** 2.00
13113. **BASE AND ROD, for use with No. 13110 and 13112. Heavily weighted. Length of rod, 16 inches; diameter of rod, ¼ inch; diameter of base, 3½ inches.**65
- SUPPORTS, Pipette, see No. 10560.**
13122. **SUPPORT TABLES, hardwood, with leaded base, adjustable in height.**

No.	A	B
Diameter of top, inches.....	4	4
Height closed, inches.....	8½	10
Height open, inches.....	13½	15
Each	1.50	1.50



No. 13124.



No. 13130.



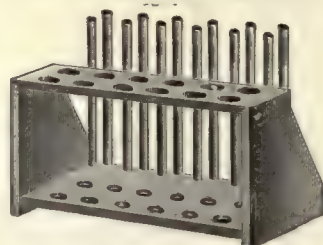
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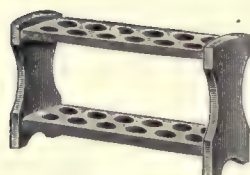
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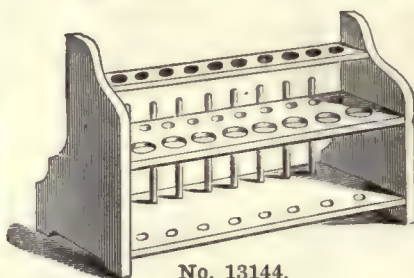
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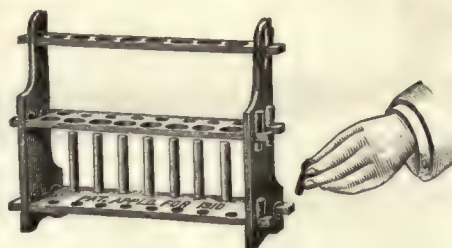
No. 13140.



No. 13138.



No. 13144.



No. 13146.

13124. SUPPORT TABLES, hardwood top with iron tripod, and brass tube, adjustable in height. The heaviness of the base and support rods make this an unusually stable support for heavy apparatus or for apparatus which should be supported free from vibration. All surfaces are turned true on the lathe, insuring a horizontal surface.

No.	A	B	C
Diameter of top, inches.....	6	8	12
Height closed, inches.....	12	16	17
Height extended, inches.....	18	26	27
Each	\$4.00	6.00	7.00

13126. SUPPORT TABLES, same as No. 13124, but with top of iron machined to a true plane. Dimensions same as No. 13124.

No.	A	B	C
Each	4.25	7.00	8.00

13130. SUPPORTS, Test Tube, copper, round, for use in water baths. Widely used in incubation and inactivation work. For tubes up to $\frac{3}{8}$ inch diameter.

No.	A	B	C
Diameter, inches.....	5	6	8
Number of holes.....	14	24	36
Each	1.00	1.25	1.50

13134. SUPPORTS, Test Tube, hardwood, with heavy base and drying pins.

No.	A	B
For tubes	6	10
Each .....	.30	.40

13136. SUPPORT, Test Tube, hardwood, Griffith's, similar to No. 13134, but with trough in base for draining, or for holding stirring rod, pipettes, etc. With 10 holes for $\frac{3}{4}$ inch tubes, 2 for 1 inch tubes and 12 drying pins..... .45

13138. SUPPORTS, Test Tube, hardwood, for twelve tubes in two rows.

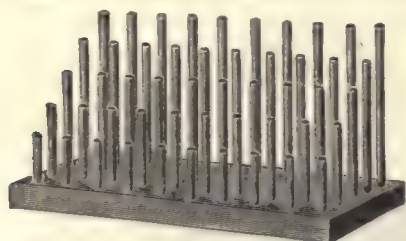
No.	A	B
Diameter of holes, inches.....	$\frac{3}{8}$	$1\frac{1}{8}$
Each .....	.65	.70

13140. SUPPORT, Test Tube, hardwood, for 12 tubes in two rows with 12 drying pins. Diameter of holes, $1\frac{1}{8}$ inches..... .80

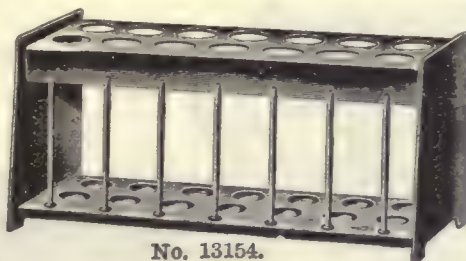
13144. SUPPORTS, Test Tube, hardwood, with two shelves, and drying pins.

No.	A	B
For test tubes.....	13	25
Each .....	.40	.70

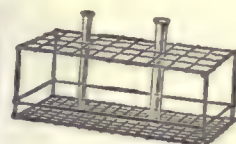
13146. SUPPORT, Test Tube, hardwood, without glued joints, shipped knocked down, with directions for putting together; for 16 tubes, with 8 drying pins..... .60



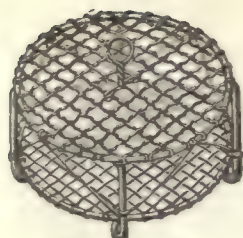
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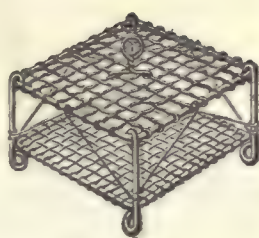
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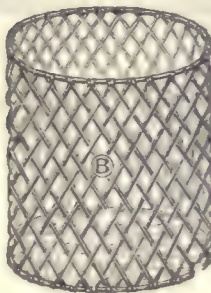
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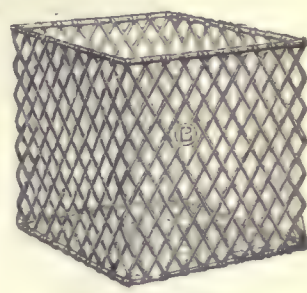
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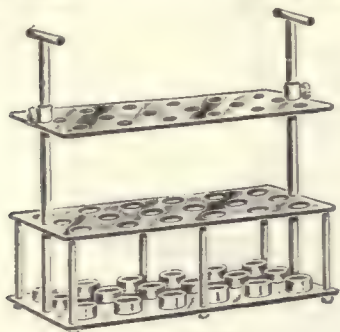
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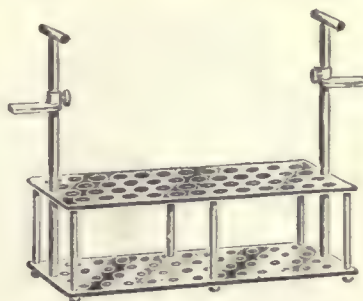
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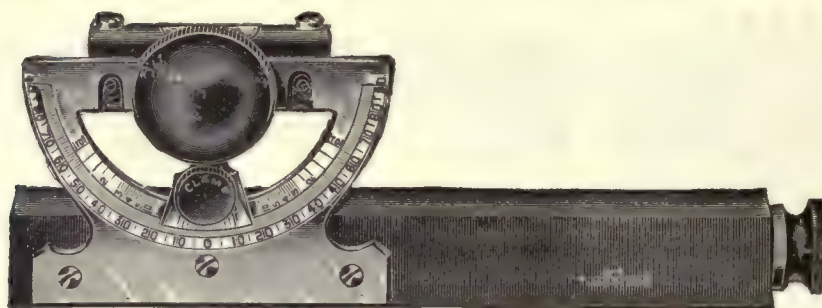


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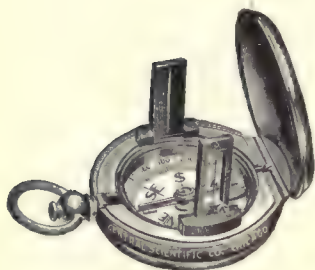


No. 13174.

13150. **SUPPORTS, Test Tube, hardwood, with pins only, for drying test tubes, bottles, flasks, etc.**
- | | | |
|---------------------|---------------|-------------|
| No. | A | B |
| For test tubes..... | 25 | 50 |
| Each | \$0.90 | 1.10 |
13154. **SUPPORTS, Test Tube, stamped steel, finished with hard baked black enamel.**
- | | | |
|---|------------|------------|
| No. | A | B |
| For test tubes..... | 14 | 18 |
| Holes for $\frac{3}{4}$ inch tubes..... | 7 | 9 |
| Holes for 1 inch tubes..... | 7 | 9 |
| Drying pins | 7 | 9 |
| Each | .40 | .60 |
13158. **SUPPORT, Test Tube, tinned iron wire. Will hold 40 tubes. Size, $9\frac{1}{2}$ inches long by $4\frac{1}{2}$ inches wide by $3\frac{1}{2}$ inches high.....** **\$1.10**
13160. **SUPPORT, Test Tube, tinned iron wire, round form, for forty-four $\frac{7}{8}$ inch test tubes. Diameter, $7\frac{1}{2}$ inches; height, $3\frac{1}{2}$ inches.....** **1.10**
13162. **SUPPORT, Test Tube, tinned iron wire, square form, for forty-eight $\frac{7}{8}$ inch test tubes. Dimensions, $7\frac{1}{2}$ inches by $7\frac{1}{2}$ inches by $3\frac{1}{2}$ inches high** **1.10**
13164. **SUPPORT, Test Tube Basket, tinned iron wire, cylindrical form, for sterilizing and incubating culture tubes. Diameter, 6 inches; height, 6 inches.....** **.80**
13166. **SUPPORTS, Test Tube Basket, tinned iron wire, rectangular form.**
- | | | |
|---------------------|-------------|----------------|
| No. | A | B |
| Height, inches..... | 6 | $5\frac{1}{2}$ |
| Width, inches | 6 | 4 |
| Length, inches..... | 6 | 5 |
| Each | 1.00 | .90 |
13168. **SUPPORT, Test Tube Basket, tinned iron wire, rectangular form, with partition in the middle. Length, $8\frac{1}{2}$ inches; width, 5 inches; height, $5\frac{1}{2}$ inches.....** **1.30**
13172. **SUPPORT, Test Tube, Vaccine, nickel-plated brass, for 18 vaccine tubes. For use in DeKhotinsky Wassermann Bath No. 14332.....** **5.00**
13174. **SUPPORT, Test Tube, Wassermann, nickel-plated brass, with holes for 48 tubes $3 \times \frac{3}{8}$ inches. For use in DeKhotinsky Wassermann Bath No. 14332.....** **4.50**
- SUPPORT, Weighing Tube, see Balance Accessories.**



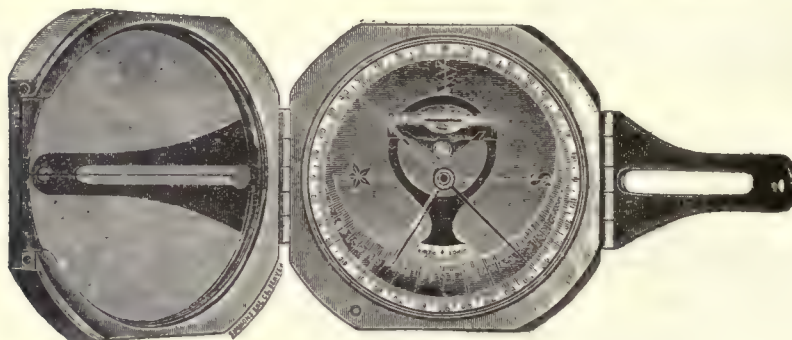
No. 13182.



No. F2625.



No. 13202.



No. 13190.

SURVEYING INSTRUMENTS, SIMPLE TYPE

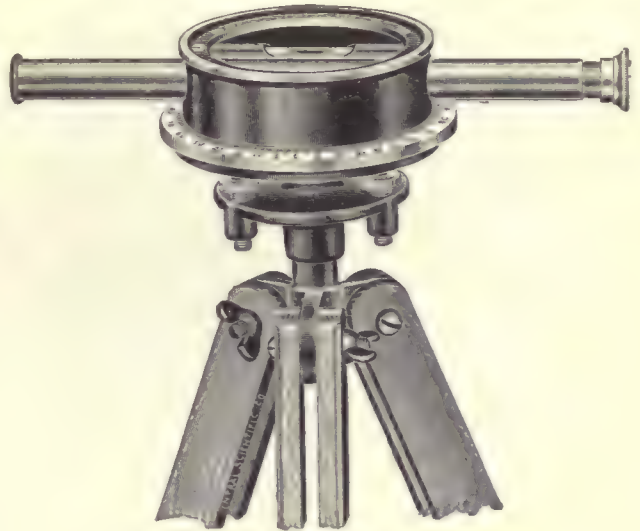
For Forestry, Mining and Geological Work.

BAROMETERS, see general heading **Barometers**.

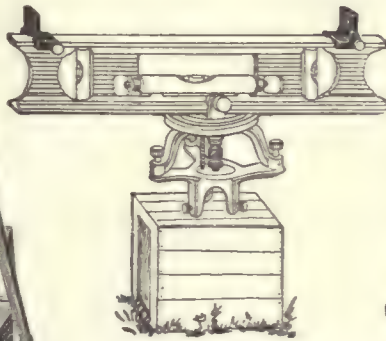
13182. **CLINOMETER**, Abney's Reflecting Level or Pocket Altimeter, for measuring the height of buildings, trees, hills, etc., and also for fixing the slopes for railroads, the rise and fall of ground for drainage purposes, and all operations where angular distance or inclination of surface is desired. Sighting tube 5 inches long, large German silver arc, extra long draw eye-piece, improved fixing clamp to vernier. The arc has two graduated scales upon it, one giving the angular measurements by degrees, and subdivided to 5 minutes by the vernier divisions on the index. The other scale is figured 1 to 10 with their subdivisions. Complete in leather case, with directions..... **\$13.50**
- F2625. **COMPASS**, Sight, watch case form, 50 mm diameter, with raised dial and full circle divisions. Bar needle, 30 mm long, with agate cap. Sights and spring cover..... **11.50**
13190. **COMPASS**, Surveying, Brunton Patented Pocket Transit, for surface and underground surveying in mining and geological work. Case is of aluminum $2\frac{3}{4} \times 2\frac{3}{4} \times 1$ inch. Weight, 8 ounces **25.00**
13202. **LEVEL**, Hand, Reflecting, for measuring slopes and gentle elevations. Consists of a square bronzed tube with level, cross-hair, and fixed eye-piece; length, 5 inches; weight, $2\frac{1}{2}$ ounces **4.00**



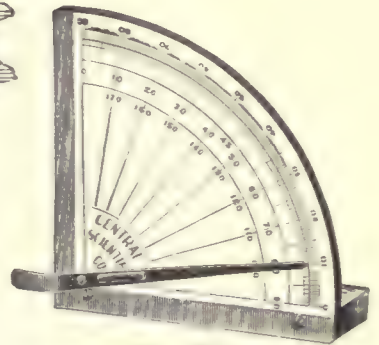
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No. 13210.

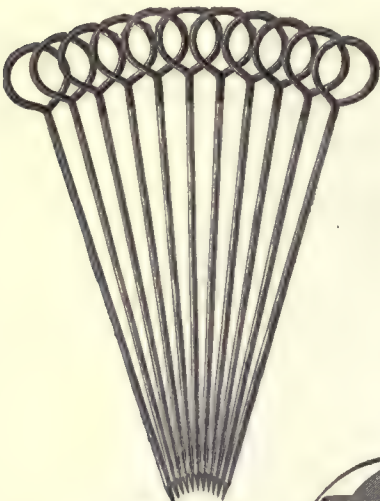


No. 13206.



No. 13216.

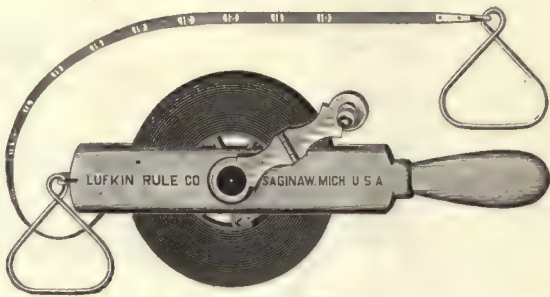
13206. **LEVEL, Simple Form**, consisting of a metal level, a pair of level sights and a stand for supporting the level upon a flat surface or on the end of a stake or crow bar. By its use one can readily determine levels from a given point to one at a distance, such as locating or setting the profiles for foundation work, ascertaining the proper grades for drains, ditches, etc. All parts of the stand are of metal, nickel-plated. The level is of metal, nickel-plated and japanned, and provided with a $3\frac{1}{2}$ inch horizontal spirit level and two $1\frac{1}{2}$ inch vertical spirit levels. The sights are adjustable and clamp to the top of the level by set screws. One sight is provided with a peep hole and the other with a horizontal cross wire. Complete as described, without stake or support **\$4.50**
13208. **LEVEL, Bostrom's Improved**, provided with telescope which has a magnifying power of eight diameters which enables the cross on the target to be read at a distance of one-quarter of a mile in any direction. A circle graduated in degrees is provided for obtaining angles, squaring up buildings, and all such work. Included in the outfit is a sliding target rod, graduated in feet, inches, and quarter inches, telescoping to five feet when closed and to nine and one-half feet when extended, and having a sliding target of the usual form with thumb-screw for securing in any position. The metal parts are of iron and brass, and the wood parts, including the target, are of pine. Complete in neat wood box with tripod, sliding target rod, target and plumb bob..... **18.00**
13210. **LEVEL, Bostrom's Improved**, similar to No. 13208, but more substantial and of finer finish. The telescope has a magnifying power of twelve diameters so that the instrument has a much greater range. All wood parts are of hardwood and all metal parts of brass except the target. Complete in neat wood box with tripod, sliding target rod, target and plumb bob **30.00**
13216. **QUADRANT**, for measuring altitudes. A sector 6 inches in diameter, graduated from 0° - 90° in single degree divisions, mounted on polished wood base, with indicator and sight attachment. A level is mounted on the base so that it may be adjusted to a true horizontal position **2.50**



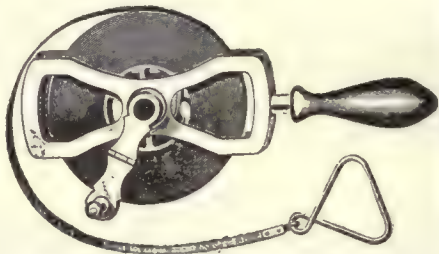
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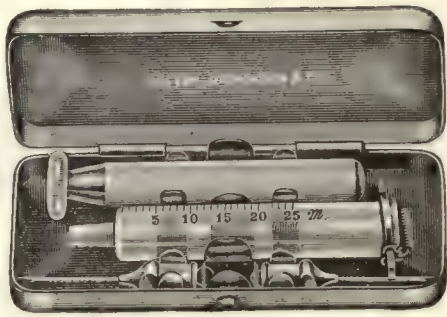
No. 13232.



No. 13224.



No. 13226.



Nos. 13242-3.

13220. **SURVEYORS' ARROWS**, made of $\frac{9}{64}$ inch round steel fourteen inches long, and with rings enameled in bright vermilion.....per set of eleven \$1.25

13224. **TAPES, Surveyors' Chain.** Heavy $\frac{1}{4}$ inch steel tape; nicely finished hardwood reel, with metal folding handle and two large and strong detachable rings. Trimmings nicely nickel-plated. Graduated in feet, with end feet in tenths; or in links, with end links in tenths, graduations etched on.

Length, feet.....	100	200	300	links	100	200	300
Each	8.00	12.50	17.50		7.00	10.00	12.50

13226. **TAPES, Surveyors' Chain**, graduated on Babbitt Metal. This tape will answer the requirements of the most severe usage and take the place of the old-time steel chain. It is made of practically unbreakable steel, heavily coated with white metal to prevent rusting and corrosion, and somewhat heavier than the ordinary chain tape. The graduations are stamped into Babbitt Metal at each foot (end feet in tenths), or at each link (end links in tenths), so that the graduations can readily be felt as the tape is allowed to pass through the hand. Each tape is provided with a pair of detachable handles, and the reel, which is built especially for such tapes, has a nickel-plated frame with folding winding handles, is easily wound and of beautiful finish.

Length, feet	100	200	300	links	100	200	300
Each	7.70	14.00	18.00		7.50	11.00	14.00

TRANSIT, Pocket, see No. 13190.

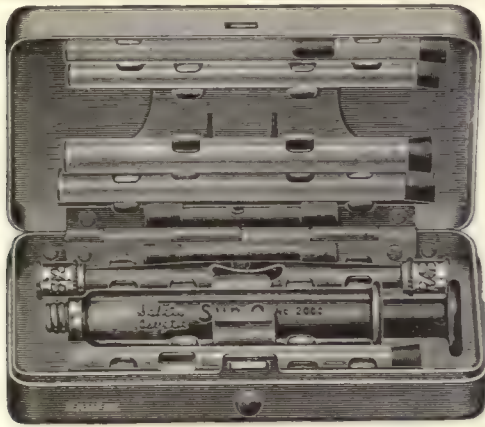
13232. **SWIMMING CUPS, Porcelain**, with perforations, for washing specimens. With cork stopper which floats the cup in the washing fluid.

No.	A	B
Diameter, mm	27	35
Height, mm	35	50
Each .....	.50	.65

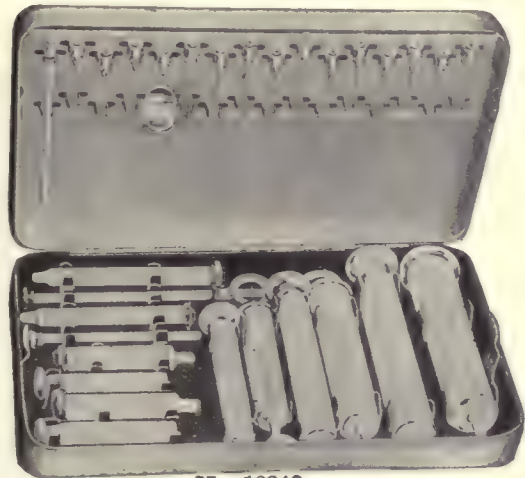
SYRINGES, ALL KINDS

SYRINGES, Hypodermic, Luer, all glass, entirely aseptic, without packing, threads or washers. Easily sterilized. With slip-on needles.

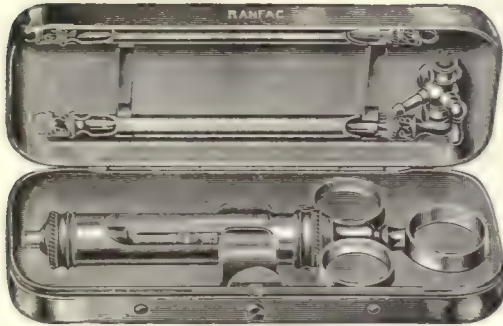
	1	2	5	10	20	30
Capacity, cc	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{2}$	1	1
Graduated in, cc.....						
13240. Syringe only, without needles.....	1.75	1.25	2.25	3.00	4.00	5.00
13241. Syringe in pasteboard box, with two steel needles	2.25	1.50	2.75	3.50	4.50	6.00
13242. Syringe in nickel-plated case, with two steel needles	3.00	2.15	3.90	4.50	6.25	7.75
13243. Syringe in nickel-plated case, with two platinum-iridium needles	4.75	4.15	9.00	10.00	13.50	15.00



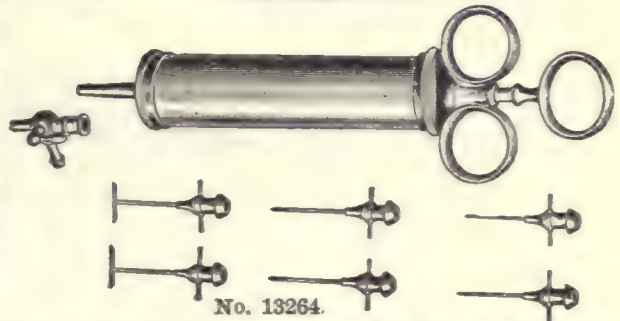
No. 13254.



No. 13246.



No. 13260.



No. 13264.

13246. **SYRINGES, Hypodermic, Luer Assortment**, consisting of 16 assorted needles for bacteriological and serological work together with one each of the following syringes, in metal case:

- Luer Syringe, $\frac{1}{2}$ cc, graduated in $\frac{1}{40}$ th, for gray oil.
- Luer Syringe, 1 cc, graduated in $\frac{1}{100}$ th, for tuberculin.
- Luer Syringe, double scale, 25 minims and $1\frac{1}{2}$ cc in $\frac{1}{40}$ th, for subcutaneous injections.
- Luer Syringe, double scale, 30 minims and 2 cc in $\frac{1}{40}$ th, for subcutaneous injections.
- Luer Syringe, 5 cc, graduated in $\frac{1}{16}$ th, for antitoxins.
- Luer Syringe, 10 cc, graduated in $\frac{1}{8}$ th, for antitoxins and salvarsan.
- Luer Syringe, 20 cc, graduated in $\frac{1}{4}$ th, for antitoxins and salvarsan.

This outfit contains all of the syringes required for investigation or practical work in bacteriology or serology. \$27.00

13248. **NEEDLES, Hypodermic, steel, slip-on type, for Luer Syringes.**

No.	A	B	C	D	E	F	G	H	J	K
Gage	26	26	24	24	24	22	22	20	20	18
Length, inches	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Per dozen	1.50	1.50	1.50	1.50	2.00	2.25	2.25	2.25	2.25	3.00

Note:—Other needles not regularly carried in stock will be furnished upon short notice.

13254. **SYRINGES, Hypodermic, Sub-Q Safety**, with plunger of black glass, provided with prongs to prevent the asbestos packing from loosening. The 6 cc and larger sizes are supplied with ring handle and with rubber coupling for needle. Complete with two polished steel needles in cardboard case. Capacity, cc

	1	2	4	6	12	20	50	100
Graduated to, cc.	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
Each	1.50	1.00	1.50	1.75	2.00	2.50	5.00	7.50

13256. **STEEL NEEDLES, for No. 13254, with threaded hub.**

For syringe, capacity, cc.	1	2	4	6	12	20	50	100
Gage	25	25	22	22	21	18	18	18
Length, inches	$\frac{5}{8}$	$\frac{5}{8}$	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{4}$
Per dozen	1.50	1.50	2.25	2.25	2.25	2.50	2.50	2.50
Per gross	15.00	15.00	22.50	22.50	22.50	25.00	25.00	25.00

Note:—Other needles not regularly carried in stock will be furnished upon short notice.

13260. **SYRINGE, Aspirating**, with piston graduated to $\frac{1}{4}$ dram, glass barrel with nickel-plated metal trimmings, finger rings, 3 aspirator needles (1 each 15 gage 3 inch, 17 gage $2\frac{1}{2}$ inch and 19 gage $1\frac{1}{2}$ inch), one 3 inch trocar and canula, and nickel-plated stop-cock. Capacity, 2 drams. Complete in nickel-plated case. 4.50

13264. **SYRINGE, Injecting**, of brass, nickel-plated; capacity, 45 cc. For use in injecting reagents and masses into different blood vessels. With two-way stop-cock, four straight canulae of different calibers, and two T canulae for injecting in both directions. Ends of canulae are grooved to prevent them from slipping out of vessels, and projections run out from base of canulae to fasten threads to. Complete as described, in wooden case with six canulae and stop-cock 9.00



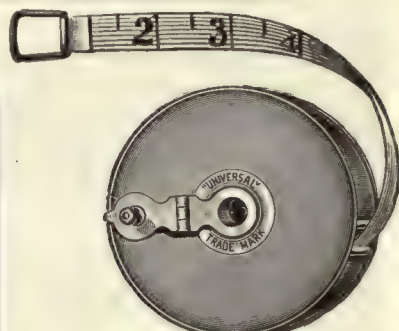
No. 13266.



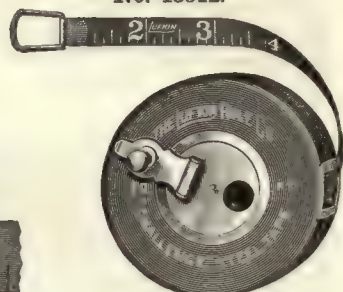
No. 13306.



No. 13300.



No. 13312.



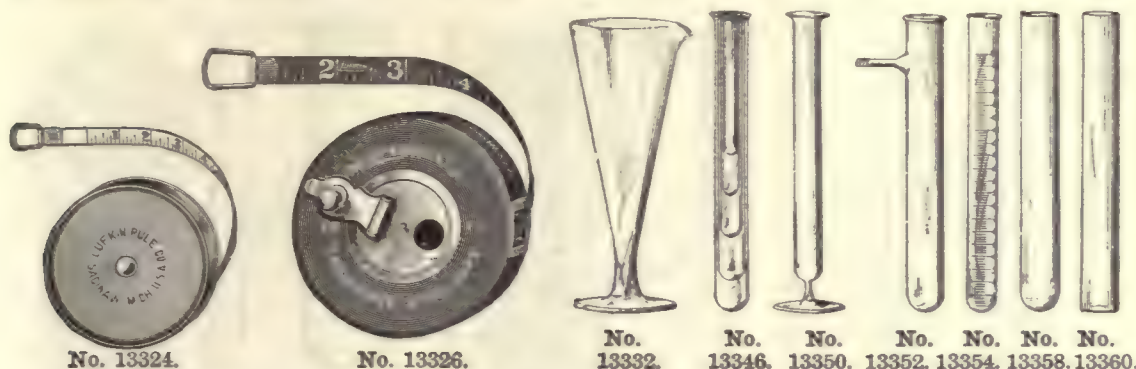
No. 13320.



See Note on Nos. 13318-20.

13266. **SYRINGE**, Injecting, Hitchen's Form, for injecting precise amounts. The mixtures are made in the syringe barrel and enough sterile salt solution is placed in the side arm to wash in the entire dose. By this means the necessity for removing the bulb of the syringe during injection is dispensed with, and accuracy of dosage is insured. Made of resistance glass which can be readily sterilized. Complete with rubber bulb, rubber connection, and antitoxin needle. (For full description see Kolmer's Infection Immunity and Specific Therapy, page 233)... \$1.50
13267. **GLASS BARREL** only of No. 13266..... .60
13268. **NEEDLES** only of No. 13266.....per dozen 3.00
13300. **TACHOMETER**, Hand, with three scales, rendering it unnecessary to change gears. The instrument is mounted in a case of aluminum, black enameled and nicely finished, with nickel-plated ring, and is provided with three dials, reading 75 to 500 r. p. m., 150 to 1000 r. p. m., and 750 to 5000 r. p. m. Diameter of dial, 3 inches; length over all, 5 inches; total weight without case, 2 pounds. Complete with triangular steel tip, rubber tip, rubber muff, extension rod, and center punch in leather carrying case with handle..... 75.00
- TALLY**, Hand, see Counter No. 3318.
13306. **TAPE**, Transparent Adhesive, for mending pages of books, drawings, papers, maps, etc., $\frac{5}{8}$ inch wide; 4 yards on spool with metal holder.....per spool .06
1536. **TAPE**, Gummed Cloth, heavy mending tape for strengthening books, pamphlets, maps, etc., $\frac{3}{4}$ inch wide. A 10 yard roll in special box with slot for drawing out as needed....per roll .20
- TAPE**, Insulating, see No. 5136.
13310. **TAPES**, MEASURING, Linen, English. Patent leather case, waterproof coated, with brass folding handle and trimmings. Tape $\frac{1}{2}$ inch wide, graduated in $\frac{1}{4}$ inches.
- | | | |
|--------------------|--------|------|
| Length, feet | 40 | 100 |
| Each | \$1.20 | 2.25 |
13312. **TAPES**, MEASURING, Linen, Metric. Brass bound case and folding handle. Tape 13 mm wide, graduated in centimeters.
- | | | |
|----------------------|-----|------|
| Length, meters | 10 | 25 |
| Each | .65 | 1.35 |
13314. **TAPES**, MEASURING, Linen, English and Metric. Nickel-plated brass case with spring wind and center stop. Tape $\frac{1}{4}$ inch wide, graduated in millimeters and $\frac{1}{8}$ inches.
- | | | |
|----------------------|-----|-----|
| Length, meters | 1 | 2 |
| Each | .60 | .90 |
13318. **TAPES**, MEASURING, Metallic, English and Surveyors. Hard leather case, folding handle, nickel-plated trimmings. Tape $\frac{5}{8}$ inch wide, made of best woven linen with metallic warp, graduated on one side in tenths of feet and on the other side in links.
- | | | |
|--------------------|------|------|
| Length, feet | 50 | 100 |
| Each | 4.50 | 7.50 |
13320. **TAPES**, MEASURING, Steel, English. Metal lined hard leather case, nickel-plated trimmings, folding winding handle opened by pressing pin on opposite side. Tape $\frac{3}{8}$ inch wide, graduated in feet, tenths, and hundredths.
- | | | |
|--------------------|------|------|
| Length, feet | 50 | 100 |
| Each | 5.60 | 9.50 |

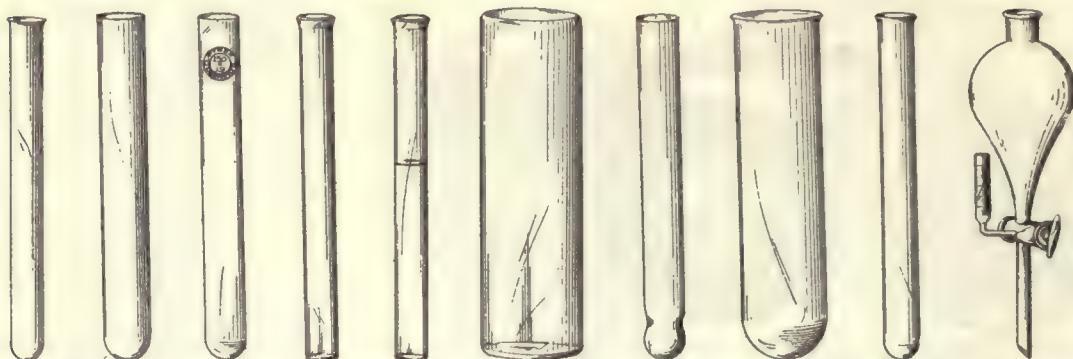
NOTE: Nos. 13318-20 Measuring Tapes are provided with a new marking by means of which instantaneous readings of both feet and inches can be made without the necessity of referring back to the last entire foot. The method is well shown in the accompanying illustration.



- 13324. TAPES, MEASURING, Steel, English and Metric, German silver case with spring wind and stop.**
Tape $\frac{1}{4}$ inch wide (5 meter, $\frac{5}{16}$ inch), graduated in millimeters and 16ths of inches.
Length, meters 1 2 5
Each \$1.00 1.50 4.50
- 13326. TAPE, Steel, Diameter Measuring, giving directly the diameter of a circular object when its circumference is measured.** In metal lined, hard leather case with nickel-plated trimmings, with folding flush handle opened by pressing upon a pin on opposite side. The tape is of steel $\frac{3}{8}$ inch in width and 50 feet long, graduated on one side in feet, tenths, and hundredths, and on the other side in diameters (inches and tenths of inches). Fitted with a special peg or spike for fastening to tree or other object to be measured..... 7.00
- TAPERS, Wax, see Wax Tapers.**
- TAR TESTER, see Asphalt and Tar Testing Apparatus.**
- 13332. TEST GLASSES, conical form, with lip, for sedimentation.**
Capacity, cc..... 30 60 125 175 250
Each50 .50 .60 .80 .90
- TEST PAPER, see Paper.**

TEST TUBES, ALL KINDS

- 13346. TEST TUBES, Thin Wall, ordinary glass, with lip, well annealed, free from lead, for chemical use.**
- | No. | A | B | C | D | E | F | G | H | J | K | L |
|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|------|---------------|------|------|-------|
| Length, inches..... | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 8 | 10 | 12 |
| Diameter, inches.... | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ | $\frac{3}{4}$ | 1 | $\frac{7}{8}$ | 1 | 1 | 1 |
| Per dozen | .17 | .20 | .22 | .24 | .25 | .27 | .40 | .45 | .55 | .75 | 1.38 |
| Per gross | 1.65 | 1.85 | 2.10 | 2.20 | 2.40 | 2.60 | 3.90 | 4.40 | 5.40 | 7.25 | 13.80 |
- 13350. TEST TUBES, Thin Wall, ordinary glass, with lip, on foot.**
- | No. | A | B | C | D | E |
|------------------------|---------------|---------------|---------------|------|------|
| Length, inches | 4 | 5 | 6 | 8 | 10 |
| Diameter, inches | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ | 1 | 1 |
| Each | .07 | .12 | .15 | .26 | .40 |
| Per dozen | .65 | 1.20 | 1.50 | 2.60 | 3.90 |
- 13352. TEST TUBES, Thin Wall, ordinary glass, with lip, with side arm.**
- | No. | A | B | C | D |
|------------------------|---------------|---------------|------|------|
| Length, inches | 5 | 6 | 8 | 10 |
| Diameter, inches | $\frac{5}{8}$ | $\frac{3}{4}$ | 1 | 1 |
| Each | .13 | .15 | .18 | .24 |
| Per dozen | 1.30 | 1.50 | 1.80 | 2.35 |
- 13354. TEST TUBES, Thin Wall, ordinary glass, with lip, graduated.**
- | | 5 | 10 | 20 | 25 | 30 |
|-----------------------|----------------|----------------|----------------|---------------|---------------|
| Capacity, cc..... | | | | | |
| Graduated to, cc..... | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{2}$ | $\frac{1}{2}$ |
| Each | .25 | .30 | .42 | .50 | .55 |
- 13358. TEST TUBES, Thick Wall, ordinary glass, without lip, culture tubes for bacteriological work, so-called Board of Health tubes.**
- | No. | A | B | C | D | E |
|-----------------------|---------------|---------------|---------------|---------------|------|
| Length, inches..... | 3 | 4 | 5 | 6 | 8 |
| Diameter, inches..... | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ | 1 |
| Per dozen..... | .30 | .35 | .40 | .45 | .85 |
| Per gross..... | 2.80 | 3.10 | 3.60 | 3.90 | 8.20 |
- 13360. TEST TUBES, Thick Wall, ordinary glass, without lip, flat bottomed, so-called specimen tubes.**
- | No. | A | B | C |
|-----------------------|---------------|---------------|---------------|
| Length, inches..... | 4 | 5 | 6 |
| Diameter, inches..... | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ |
| Per dozen..... | .35 | .40 | .45 |
| Per gross..... | 3.10 | 3.60 | 3.90 |



No. 13364. No. 13370. No. 9332. No. 9334. No. 13382. No. 13386. No. 13390. No. 13400.

13364. **TEST TUBES, Thin Wall, non-corrosive glass, with lip, for chemical work.**

No.	A	B	C	D	E
Length, mm	100	120	150	175	200
Diameter, mm	12	15	18	22	25
Per dozen	\$0.25	.30	.35	.55	.70
Per gross	2.15	2.65	3.05	5.30	6.60

13366. **TEST TUBES, Thick Wall, non-corrosive glass, without lip, for bacteriological work.**

No.	A	B	C	D	E
Length, inches	3	4	5	6	8
Diameter, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Per dozen .....	.40	.45	.50	.55	1.10
Per gross	3.40	3.80	4.30	4.65	9.90

13370. **TEST TUBES, Thick Wall, Pyrex glass, without lip, for combustion and ignition purposes, thickness of wall, about $1\frac{1}{2}$ mm.**

No.	A	B	C	D
Length, mm	100	125	150	200
Diameter, mm	16	16	19	25
Per dozen	1.25	1.50	1.80	7.20
Per gross	12.50	15.00	18.00	72.00

9330. **TEST TUBES, Butter Fat Oil, plain, $9 \times \frac{3}{4}$ inches.....per dozen** .90

9332. **TEST TUBES, Butter Fat Oil, with line 5 inches from bottom.....per dozen** .90

9334. **TEST TUBES, Cream, heavy, for samples, $5 \times 1\frac{1}{4}$ inches.....per dozen** .90

TEST TUBES, Ignition, with bulb at bottom, see Reduction Tubes.

13382. **TEST TUBES, Potato Culture, ordinary glass, with lip, with constriction and bulb at the bottom. Length, 150 mm; diameter, 18 mm.....per dozen** .90

13386. **TEST TUBE, Titer Tube, ordinary glass, with lip, for determining the melting and solidifying points of fats, and waxes. Length, 4 inches; diameter, 1 inch; thickness of wall, about 1 mm. (See Journal of the Association of Official Agricultural Chemists, Vol. II, No. 3, part II, November 15, 1916, page 303; Journal of Industrial and Engineering Chemistry, Vol. X, No. 4, for April 1918, page 317).....** .90

13390. **TEST TUBES, Wassermann, Thin Wall, non-corrosive glass, with lip, for serological work.**

Length, mm	75	100
Diameter, mm	10	12
Per dozen .....	.20	.25
Per gross	2.00	2.15

13394. **TEST TUBES, Opaque Fused Silica, heavy wall, with lip.**

Length, inches	4	5	6	7
Diameter, inches	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Each	1.06	1.50	2.20	2.81

13396. **TEST TUBES, Transparent Quartz, valuable for rapid heating, since they may be applied to the hottest flame without fear of cracking.**

Length, mm	100	100	120	125	150	150
Diameter, mm	10	15	15	20	20	25
Each	1.32	3.12	3.60	4.80	5.40	6.90

TEST TUBE BRUSHES, see Brushes.

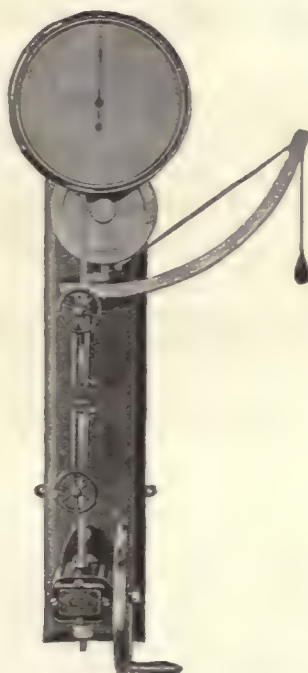
13400. **TEST TUBE FILLING ATTACHMENT, for measuring out exact quantities of culture media and other chemical fluids. Consists of a separatory funnel with three-way stop-cock, to one arm of which is attached a graduated side tube. Capacity, 250 cc.....** 3.50

TEST TUBE HOLDERS, see Clamps.

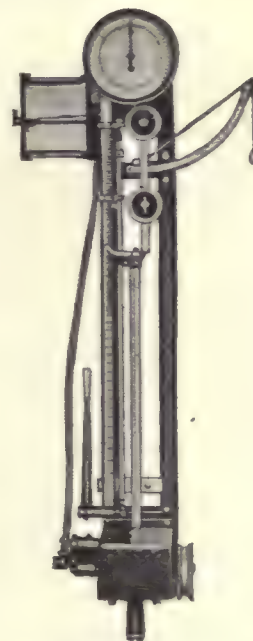
TEST TUBE SUPPORTS, see Supports.



No. 13410.



No. 13412.



No. 13416.

TESTING MACHINES FOR YARN, CLOTH, PAPER AND RUBBER

13410. **TESTING MACHINE, Yarn, Hand Operated**, constructed on the dead weight lever or pendulum principle, without springs or delicate parts to wear out or cause trouble. The machine will take 54 inch skeins, but may be used on 36 inch skeins by the addition of an extension hook. For short single strands special clamping screws may be obtained. The pull is registered automatically by the pointer on the dial until reset by the operator. With 9 inch heavy iron hand wheel, mounted on oak back board, with all metal parts finished in black enamel and nickel-plate.

Capacity, pounds.....	100	150	200	250
Each (F. O. B. Factory).....	\$62.50	67.50	74.75	80.00

Note:—These machines are not carried in stock and we can not guarantee immediate delivery.

13412. **TESTING MACHINES, Cloth and Paper, Hand Operated**, similar in construction to No. 13410, but with clamps for use with cloth or paper, designed to make various styles of tests. The open space back of the gripping surfaces allows large samples to be used without cutting or stripping. Mounted on oak back board with iron brackets for attachment to wall. Total length of machine, about 5 feet.

Capacity, pounds.....	100	150	200	250
Each (F. O. B. Factory).....	90.00	104.50	112.50	163.50

Note:—These machines are not carried in stock and we can not guarantee immediate delivery.

13416. **TESTING MACHINE, Rubber, for Power Operation**, vertical type, designed to be fastened to the wall. The construction is similar to that of the textile testers described under Nos. 13410 and 13412, but modified to meet the requirements of the rubber trade. The dial is graduated with two rows of figures, the outer reading from 0 to 250 pounds in 1 pound divisions, the inner from 0 to 50 pounds in $\frac{1}{4}$ pound divisions. The shift is made by removing the lower weight from the lever. The stretching screw is $1\frac{1}{8}$ inches in diameter and has a maximum stroke of 48 inches, the length being controlled by a vertical rod carrying two adjustable collars which mark the starting point and the reverse. After each test the machine reverses automatically, stopping in the proper position to receive a new sample. The normal speed of 20 inches per minute of the stretching screw may be varied as desired. A graduated brass scale at the left of the machine carrying two riders connected by a graduated steel tape enables the total stretch of the sample or the distance between any two marks to be read to $\frac{1}{10}$ of an inch. This machine can be arranged to test fabrics, cord, paper, twines, yarn and other materials as well as rubber. Total length of machine, 7 feet; power required to operate, $\frac{1}{8}$ h. p. With one pair of clamps and pulley for belt, but without motor.

F. O. B. Factory.....	350.00
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Note:—This machine is not carried in stock and we can not guarantee immediate delivery.

13417. **CLAMPS, Flat Grip**, for use with No. 13416 to adapt it for paper testing.

Per pair (F. O. B. Factory).....	45.00
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For other **PAPER TESTING MACHINES**, see **Paper Testing Apparatus**.

TEXTILE BALANCES, CONDITIONING OVENS, etc., write for information.

THERMIT FOR LABORATORY EXPERIMENTS

We list the necessary equipments for a series of four interesting experiments with Dr. Goldschmidt's Thermit, a compound of a metallic oxide and granulated aluminum which, when ignited, starts a chemical reaction which will produce a temperature of 3000° C. This is now used extensively in welding fractures in iron castings and rails, as the molten thermit iron has the property of melting the surface of the iron it comes in contact with, and forming a solid mass.

13418. **THERMIT**, Experiment I. Welding a small piece of steel to a plate.
 Steel Plate, $\frac{3}{16}$ inch thick. 2 Cans Thermit.
 2 Pouring Cups. Bottle Ignition Powder.
 Pair Dark Glasses to protect Eyes.
Complete set \$25.00
13419. **THERMIT**, Experiment II. Burning a hole through a plate.
 Steel Plate, 9 inch square x $\frac{1}{4}$ inch thick. 4 Packages Plugging Material.
 Tripod. Bottle Ignition Powder.
 2 Cans Thermit. Pair Dark Glasses.
 Tapping Spade. Large Crucible.
 Shipping Weight, 102 lbs.
Complete set 20.00
13420. **THERMIT**, Experiment III. Welding a large boss to a steel plate (showing the manner of welding in industrial uses).
 2 Steel Plates, $\frac{3}{8}$ inch. 2 Fire-Brick Molds.
 Large Crucible. Tripod.
 Bottle Ignition Powder. 2 Welding Portions.
 Package Luting Material. Tapping Spade.
 2 Packages Plugging Material. Pair Dark Glasses.
 Shipping Weight, 152 lbs.
Complete set 21.50
13421. **THERMIT**, Experiment IV. Pipe welding. This experiment shows the following peculiar characteristics of the slag: First, its very high temperature; second, that it sets at a very high temperature; third, that in plastic condition it is highly refractory remaining in a layer distinct from the steel.
 4 Pieces Standard Pipe, 6 x 1 inches. 3 Welding Portions.
 Mold. Small Crucible.
 Pair Tongs. 1 Set Clamps.
 Bottle Ignition Powder. Pair Dark Glasses.
 Shipping Weight, 86 lbs.
Complete set 35.00
13422. **THERMIT COMBINATION SET**, suitable for all four experiments. Shipping weight, 270 lbs. 65.00
13423. **THERMIT COMBINATION SET**. Experiments I-III. Shipping weight, 230 lbs. 30.00
13424. **THERMIT**, blackper pound .65
13425. **IGNITING MIXTURE** (8 oz. smallest quantity sold)per pound 1.50
- THERMO-COUPLES**, see **Pyrometers**.

No. 13426.

THERMOMETERS, ALL KINDS THERMOMETERS FOR GENERAL USE

13426. **THERMOMETERS**, Solid Stem, Engraved Scale, for general use. Diameter of stem, about $\frac{1}{4}$ inch. Graduated in 1° divisions.
- | No. | A | B | C | D | E | F |
|-----------------------|---------|------------|----------|----------|----------|----------|
| Range, degrees C..... | 0 to 60 | -10 to 110 | 0 to 150 | 0 to 200 | 0 to 250 | 0 to 350 |
| Length, inches | 10 | 12 | 12 | 14 | 14 | 16 |
| Each | 1.10 | 1.20 | 1.25 | 1.60 | 1.80 | 2.00 |
13428. **THERMOMETERS**, Solid Stem, Engraved Scale, same as No. 13426, but graduated in Fahrenheit scale, in 2° divisions.
- | No. | A | B | C |
|-----------------------|-----------|-----------|-----------|
| Range, degrees F..... | 10 to 220 | 30 to 400 | 30 to 650 |
| Length, inches | 12 | 14 | 16 |
| Each | 1.20 | 1.60 | 1.80 |
13430. **THERMOMETERS**, Solid Stem, Engraved Scale, same as No. 13426, but with double scale.
- | No. | A | B | C |
|-----------------------|------------|-----------|-----------|
| Range, degrees C..... | -10 to 110 | 0 to 200 | 0 to 350 |
| Range, degrees F..... | 10 to 220 | 30 to 400 | 30 to 650 |
| Each | 1.80 | 2.00 | 2.50 |



No. 13438.



No. 13444.

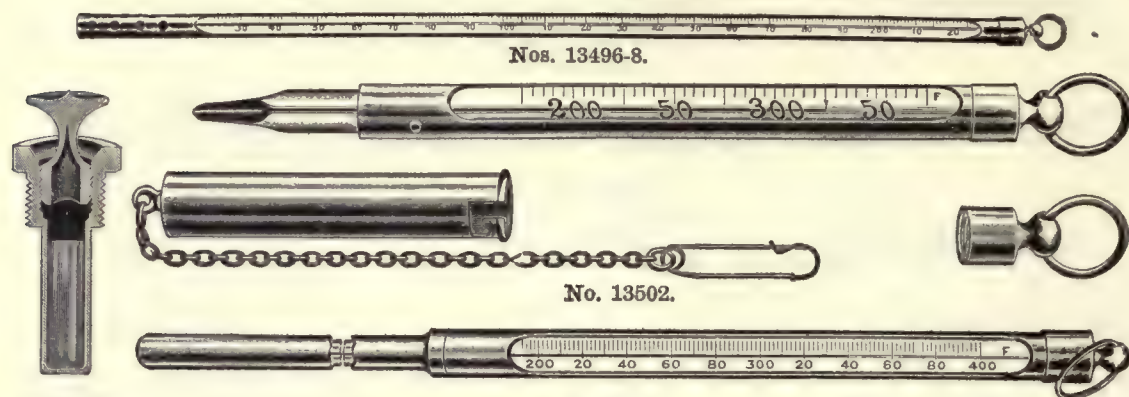


No. 13464.

13432. **THERMOMETERS, Solid Stem, Engraved Scale**, similar to No. 13426, but more accurately graduated and furnished with factory certificate. No. ... A B C
 Range, degrees C. -10 to 100 -10 to 200 -10 to 320
 Each \$2.75 3.25 3.50
13436. **THERMOMETERS, Enclosed Milk Glass Scale**, diameter 8 to 10 mm, with Centigrade scale.
 No. A B C
 Range, 0° to, degrees C. 110 200 350
 Each 2.25 3.00 3.50
13438. **THERMOMETERS, Solid Stem, Engraved Scale**, with fractional divisions, for general laboratory work where highest degree of precision is not required. With Centigrade scale. Diameter, about 7 mm. No. ... A B C D E F G
 Range, degrees C. 0-50 0-50 0-100 0-100 100-200 0-200 100-200
 Size of subdivisions, deg. C. . 1/10 1/10 1/2 1/10 1/2 1/2 1/10
 Length, cm 30 38 40 60 50 60 60
 Each 3.50 4.50 4.00 4.50 4.25 6.00 7.00
13442. **THERMOMETERS, High Range, Solid Stem, Engraved Scale**, filled with nitrogen above the mercury. Diameter, about 7 mm. No. A B
 Range, degrees C. 100-400 100-550
 Size of subdivisions, degrees C. 2 2
 Length, cm 40 40
 Each 3.50 5.00
13444. **THERMOMETERS, High Range**, same as No. 13442, but graduated in Fahrenheit scale.
 No. A B
 Range, degrees F. 200-750 200-950
 Size of subdivisions, degrees F. 5 5
 Length, cm 40 40
 Each 3.50 5.00
13446. **THERMOMETERS, High Range, Solid Stem, Engraved Scale**, filled with carbon dioxide under pressure of 20 atmospheres. Diameter, 7 to 8 mm.
 No. A B
 Range, degrees C. 100-500 180-550
 Size of subdivisions, degrees C. 1 1
 Length, cm 40 40
 Each 9.00 9.00
13452. **THERMOMETER, Low Range, Solid Stem, Engraved Scale**, for low temperatures. Range, -20° to 40°C., in 1° divisions. Length, about 25 cm; diameter, 8 mm. 2.00
13454. **THERMOMETER, Low Range, Solid Stem, Engraved Scale, Alcohol Filled**, for low temperatures. Range, -50° to 50°C., in 1/2° divisions. Length, about 30 cm; diameter about 8 mm. 4.50
13456. **THERMOMETER, Low Range, Solid Stem, Engraved Scale, Pentane Filled**, for very low temperatures. Range, -200° to 50°C., in 1° divisions. Length, about 35 cm; diameter, about 10 mm. 10.00
13458. **THERMOMETER, Low Range, Solid Stem, Engraved Scale, Toluol Filled**, for low temperatures. Range, -100° to 50°C., in 1° divisions. Length, about 30 cm. 7.50

THERMOMETERS, NORMAL OR PRECISION

13464. **THERMOMETERS, Normal or Precision, Solid Stem, Engraved Scale**, for precision measurements where highest accuracy is essential. Thermometers reading above 250°C. are filled with nitrogen. Graduated according to the requirements of the United States Bureau of Standards. Without certificate.
 No. A B C D E F
 Range, degrees C. -15 to 50 -15 to 100 -5 to 105 -10 to 110 0 to 250 0 to 300
 Size of subdivisions, deg. C. . 1/10 1 1/2 1/10 1/2 1
 Length, cm 38 30 38 60 45 45
 Each 12.00 8.00 10.00 18.00 9.50 7.50
13465. **THERMOMETERS, Normal or Precision**, same as No. 13464, but standardized by the United States Bureau of Standards, with certificate.
 No. A B C D E F
 Each 15.00 14.00 16.00 24.00 15.50 15.00



No. 13500.

No. 13506.

7373. **THERMOMETER, Solid Stem, Engraved Scale, for Use with Moisture Testers.** Length, 12 inches. Range, 0° to 200° Centigrade in 1° divisions. With factory certificate.... \$2.00
13486. **THERMOMETER, Titer Test, Solid Stem, Engraved Scale,** according to the requirements of the Association of Official Agricultural Chemists. Range, 10° to 65° C., in 1/10° divisions with zero point marked, and with reservoirs at upper end and between 0° and 10° marks. Length of thermometer, 38 cm; length of bulb, 3 cm; distance between top of bulb and 10° mark, 3 to 4 cm; diameter of stem and bulb, about 6 mm. (See Journal of the Association of Official Agricultural Chemists, Vol. II, No. 3, Part II, November 15, 1916, page 302; Journal of Industrial and Engineering Chemistry, Vol. X, No. 4, for April 1918, page 317)..... 9.90

THERMOMETER FOR SPECIAL USES

13496. **THERMOMETERS, Armored, Solid Stem, Engraved Scale,** with armor of seamless steel tubing, nickel-plated, with lower end perforated around bulb to permit circulation. Thermometer is suspended from screw cap and easily removed. Scaled for 3 inch immersion.

No.	A	B	C	D	E
Range, degrees F.....	0-220	30-400	30-600	30-750	100-950
Size of subdivisions, degrees F.....	2	2	2	2	5
Length, inches	12	14	16	16	16
Each	5.00	5.80	6.60	8.25	11.55

13497. **THERMOMETER TUBES, extra, for No. 13496.**

No.	A	B	C	D	E
Each	2.50	3.30	4.15	5.80	9.10

13498. **THERMOMETERS, Armored, same as No. 13496, but with Centigrade scale.**

No.	A	B	C	D	E
Range, degrees C.....	0-100	0-200	0-300	0-400	50-510
Size of subdivisions, degrees C.....	1	1	1	1	2
Length, inches	12	14	16	16	16
Each	5.00	5.80	6.60	8.25	11.55

13499. **THERMOMETER TUBES, extra, for No. 13498.**

No.	A	B	C	D	E
Each	2.50	3.30	4.15	5.80	9.10

13500. **WELLS, Steel, for use with Nos. 13496 to 13499.** Threaded for 1/2 inch pipe and fitted with screw plug. Length below thread, inches
- | | | | | |
|------------|-------|-------|-------|-------|
| Each | 1 1/2 | 2 1/2 | 3 1/2 | 4 1/2 |
| | 1.65 | 2.30 | 3.00 | 3.65 |

13502. **THERMOMETERS, Armored, Asphalt and Sand Testing, Solid Stem, Engraved Scale,** with seamless brass tubing, nickel-plated, and with pointed bulb to facilitate introduction into the sample. Constructed of glass tubing with walls of double thickness to withstand severe usage. Scaled for 3 inch immersion, except No. A, which is for total immersion.

No.	A	B	C
Range, degrees F.....	200-400	100-600	200-750
Size of subdivisions, degrees F.....	5	5	5
Length, inches	6	16	16
Use	inspection	asphalt	sand
Each	5.00	6.60	8.25

13503. **THERMOMETER TUBES, extra, for No. 13502.** No.
- | | | | |
|------------|------|------|------|
| Each | A | B | C |
| | 2.50 | 4.15 | 5.75 |

13506. **THERMOMETERS, Armored, Asphalt, with Protected Bulb, and engraved stem.** The bulb is immersed in a bath of mercury contained in the long slender steel cup forming the stem, affording protection and making it almost as quick reading as a bare glass bulb. Length of case, 10 inches. No.
- | | | |
|--------------------------------------|---------|---------|
| Range, degrees F..... | A | B |
| Size of subdivisions, degrees F..... | 200-400 | 200-650 |
| Each | 2 | 5 |
| | 6.60 | 6.60 |



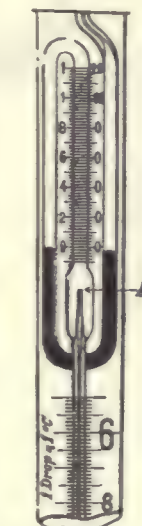
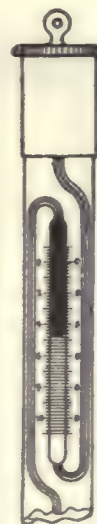
No. 13508.



No. 13514.



Nos. 13518-9.



No. 13522.

13507. THERMOMETER TUBES, extra, for No. 13506.

No.	A	B
Each	\$3.30	3.30

13508. THERMOMETER, Automatic Alarm, for giving an alarm the instant the temperature registers a given degree. Consists of a straight mercury tube, into the bore of which a fine platinum wire is fused at 32° F., or at any other degree desired. Through a non-sparking relay attachment a bell is made to ring at practically any distance from the thermometer itself, at the exact moment the temperature where the instrument is located reaches the danger point. Strongly constructed and fully protected by a heavy metal weather-proof case, which allows circulation of air. May be installed in three different ways: (1) one thermometer and simple alarm; (2) more than one thermometer and simple alarm; (3) more than one thermometer and annunciator alarm showing exact location of danger point. **In ordering, kindly state the temperature at which alarm is to be given.** Complete with relay, but without batteries, bell, or wire **18.00**

13510. THERMOMETER, Automatic Alarm, similar to No. 13508, but arranged to ring at either of two temperatures desired, which must be specified when ordering. Complete with relay, but without batteries, bell, or wire..... **24.30**

13514. THERMOMETER, Bake Oven, Medium Grade, consisting of a glass tube, mercury-filled, mounted on 5-inch flanged metal scale with sand blast finish and white figures. With round removable base with asbestos mat attached. Range, about 100° to 600° F..... **1.50**

THERMOMETER, Beckmann, for the exact determination of slight changes in temperature. Widely used in calorimetry and in boiling and freezing point determinations. Consists of a capillary of normal glass graduated to 1/100 degree over a range of 5° or 6° C., with an auxiliary scale at the top graduated from -10° to 120° C., in 2° divisions, sealed in a glass jacket with metal cap. The thermometer may be set to read at any temperature between -10° and 120° C. Constructed and graduated according to the requirements of the United States Bureau of Standards.

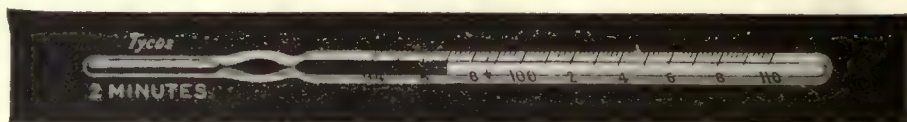
13518. Without certificate **20.00**

13519. With Bureau of Standards certificate..... **32.50**

THERMOMETER, Beckmann, improved, similar to No. 13518, but with improved method of adjustment of temperature. In the reservoir beneath the auxiliary scale is a short capillary (a), the opening of which is adjusted to deliver a drop of mercury of sufficient size to produce a fixed change of temperature in degrees C., the exact amount of this change being engraved on the scale of the thermometer. This improved construction obviates the necessity of tapping the mercury column, with the consequent danger of breakage. It also makes easier the return of excess mercury from the reservoir to the bulb which takes place automatically if the thermometer is held in a perpendicular position. Mercury from the reservoir may be transferred to the side arms by merely inclining the thermometer. Graduated according to the requirements of the United States Bureau of Standards.

13522. Without certificate **25.00**

13523. With Bureau of Standards certificate..... **37.50.**



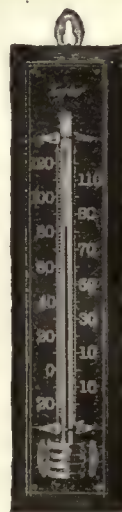
No. 13546.



No. 13548.



No. 13562.



No. 13564.

THERMOMETERS, Calorimeter, Solid Stem, Engraved Scale, as used with oxygen bomb calorimeters. Graduated to meet the requirements of the United States Bureau of Standards. No. A B

Range, degrees C.....	18-30	20-30
Size of subdivisions, degrees C.....	1/50	1/100
Length, inches	18	24

13528. Without certificate \$15.00 20.00

No. 13558. 13529. With Bureau of Standards certificate 30.00 35.00

THERMOMETERS, Calorimeter, Solid Stem, Engraved Scale, as used with Parr Calorimeters. Graduated to meet the requirements of the United States Bureau of Standards.

No.	A	B
Range, degrees F.....	65 to 90	65 to 105
Size of subdivisions, degrees F.....	1/20	1/20
13532. Without certificate	10.00	13.00
13533. With Bureau of Standards certificate.....	12.00	15.00

THERMOMETERS, Gas Calorimeter, Solid Stem, Engraved Scale, according to the recommendations of the American Gas Institute, as used in Junker and other gas calorimeters. Length, about 45 cm; diameter, about 8 mm. (See Report of Committee on Calorimetry for 1912.)

No.	A	B
Range	60° to 110°F.	15° to 40°C.
Size of subdivisions, degrees.....	1/10	1/10
13536. With factory certificate.....	18.00	18.00
13537. With Bureau of Standards certificate.....	25.00	25.00

13540. **THERMOMETER, Gas Calorimeter, Solid Stem, Engraved Scale, high grade. Graduated from 30° to 150° F., in 1/10° divisions..... 8.50**

13546. **THERMOMETER, Clinical, One Minute, first grade, with magnifying tube, in hard rubber case, with factory certificate** 1.50

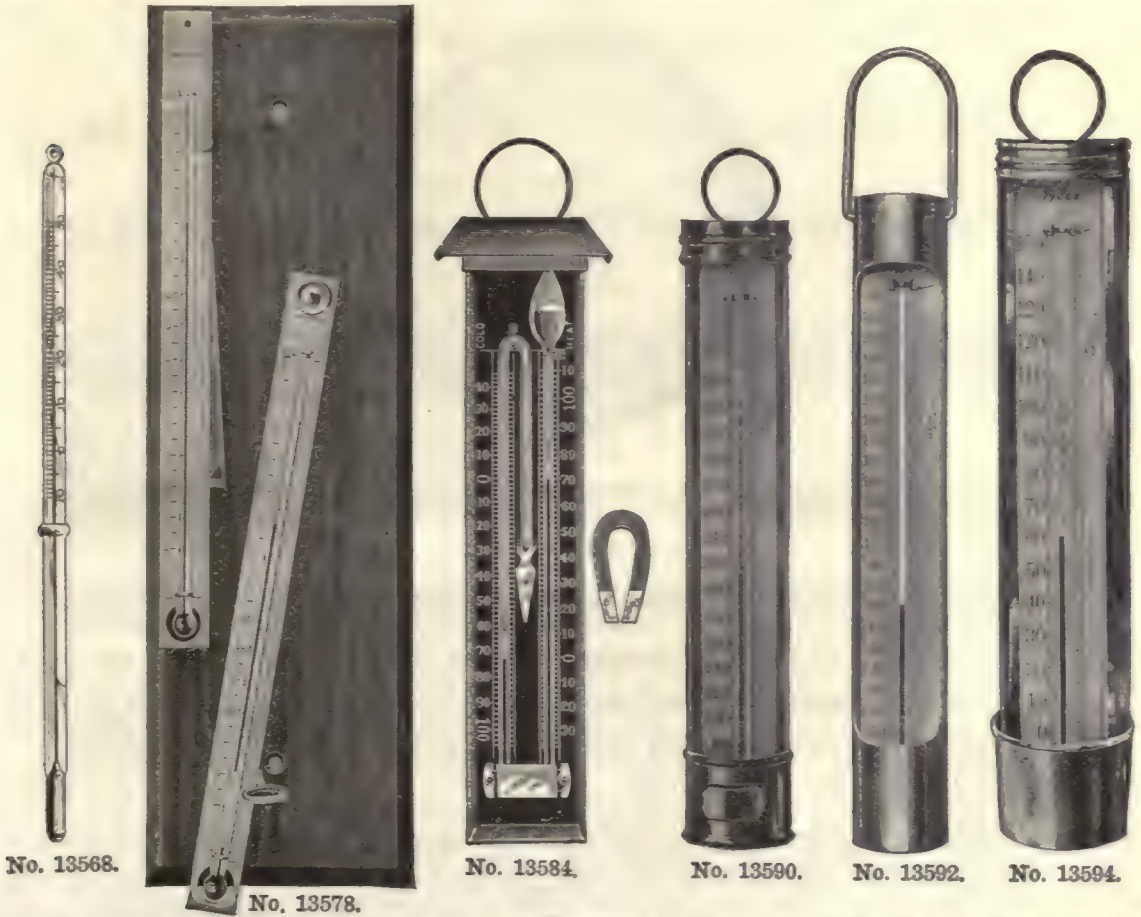
13548. **THERMOMETER, Clinical, Veterinary, first grade, pear-shaped bulb, ring top, with magnifying tube, in hard rubber case, with factory certificate** 1.75

THERMOMETERS, Dairy, see Milk Testing Apparatus.

13558. **THERMOMETER, Dough Testing, of glass in 7 inch nickel-plated iron case, with 11 inch steel stem. The scale is of silvered metal with black filled figures and graduations. Range, 30° to 120° F.** 8.00

13562. **THERMOMETER, Household, standard grade, 10 inch, heavy japanned tin case, accurately tested. Approximate range,—20° to 120°F.....** 1.35

13564. **THERMOMETER, Household, 8 inch, metal scale, oak back, beveled edge, with brass guard over bulb. Approximate range,—20° to 120°F.....** 1.00



- No. 13568. THERMOMETER, Incubator, Solid Stem, Engraved Scale,** with enlargement in stem to prevent slipping through hole in stopper. Length, about 20 cm. Range, 0° to 50° C., in 1° divisions **\$2.50**
- 13572. THERMOMETER, Maximum Registering, U. S. Weather Bureau Pattern,** 12 inch, cylindrical bulb, graduation etched on tube. The tube is mounted on an aluminum scale on which is marked every 5 degree line of the scale, and the figures every 10 degrees. Has brass insulating support and binding screws. Approximate range, -30° to 120° F. With manufacturer's certificate **7.20**
- 13574. THERMOMETER, Minimum Registering, U. S. Weather Bureau Pattern.** Same general description as No. 13572. Mercury filled tube. With manufacturer's certificate..... **6.60**
- 13578. THERMOMETERS, Maximum and Minimum Registering, U. S. Weather Bureau Pattern.** Same thermometers as Nos. 13572 and 13574, but with special insulating support. Mounted on mahogany finish back, 17x5 inches, with manufacturer's certificate for each thermometer. **Per set 14.40**
- 13579. THERMOMETER, Maximum, only for No. 13578.** With manufacturer's certificate..... **7.20**
- 13580. THERMOMETER, Minimum, only for No. 13578.** With manufacturer's certificate..... **6.60**
- 13584. THERMOMETER, Maximum and Minimum Registering, Six's Pattern,** in japanned tin case with metal scale. Length, 8 inches; approximate range, -20° to 120° F. Complete with horseshoe magnet for resetting **4.20**
- 13590. THERMOMETERS, Metal Scale, highest grade, with scale of oxidized brass in black japanned tin case.** Length, 10 inches. No. **A B C**
- | | | | |
|-----------------------|------------|----------|-----------|
| Range, degrees F..... | -20 to 120 | 0 to 220 | 50 to 350 |
| Each | 1.25 | 1.25 | 1.50 |
- 13592. THERMOMETER, Metal Scale, with Copper Cup, highest grade, for determining the average temperature of oil or other liquids in tank cars or tanks and securing a sample at the same time.** Range, 10° to 220° F. Length, 12 inches **3.30**
- 13594. THERMOMETER, Metal Scale, Sugar Factory, standard grade, with magnifying tube filled with mercury, silvered brass scale with black figures, and brass screw clamps.** Bottom of copper case is closed to permit samples to be taken. Length, 12 inches. Range, about 0° to 150° Centigrade **2.75**
- THERMOMETERS, Metal Frame, Straight and Angle Stem, for steam boilers, water heaters, oil stills, etc.** Send for special bulletin.



No. 13598.



No. 13612.



No. 13618.

13598. **THERMOMETER, METALLIC, Demonstration Form**, with glass back to show the internal mechanism, which consists of a strip of two metals soldered together and connected with an index hand by a multiplying lever. Diameter 6 inches. Range, —50 to 150 degrees F.. \$4.50

THERMOMETERS FOR OIL TESTING

13606. **THERMOMETER, Paper Scale, for Cold Test**, graduated from —20° to 120° F., in 2° divisions. For determining the congealing point of lubricating oils. Length, 8 inches..... 3.30
13608. **THERMOMETER, Paper Scale, for Flash and Fire Test**, graduated from —20° to 230° F., in 1° divisions. For use with No. 9676 Open Fire Tester. Length, 12 inches..... 3.30
13610. **THERMOMETER, Paper Scale, for Wax Test**, graduated from 90° to 150° F., in ¼° divisions. For determining melting point of waxes, paraffines and greases. Length, 12 inches.... 4.40
13612. **THERMOMETER, Solid Stem, Engraved Scale, for Cold Test**, graduated from —20° to 140° F., in 2° divisions, for determining the congealing point of lubricating oils. Length, 8¾ inches 2.50
13613. **THERMOMETER, Solid Stem, Engraved Scale, for Cold Test**, graduated from —40° to 100° F., in 1° divisions. Length, 30 cm..... 2.00
13614. **THERMOMETER, Solid Stem, Engraved Scale, for Cold Test**, same as No. 13613, but graduated from —40° to 40° C., in 1° divisions. Length, 25 cm..... 2.00
13616. **THERMOMETERS, Solid Stem, Engraved Scale, for Distillation**. Pointed for 3 inch immersion.
- | | | | |
|--------------------------------------|-----------|-----------|------------|
| No. | A | B | C |
| Range, degrees F..... | 30 to 400 | 30 to 750 | 100 to 950 |
| Size of subdivisions, degrees F..... | 2 | 2 | 5 |
| Length, inches | 15 | 15 | 16 |
| Each | 4.15 | 8.25 | 9.10 |
13618. **THERMOMETERS, Solid Stem, Engraved Scale, for Distillation**. Same as No. 13616, but graduated in Centigrade scale. No.
- | | | | |
|--------------------------------------|------|------|------|
| No. | A | B | C |
| Range, 0° to, degrees C..... | 200 | 400 | 510 |
| Size of subdivisions, degrees C..... | 1 | 1 | 2 |
| Length, inches | 15 | 15 | 16 |
| Each | 4.15 | 8.25 | 9.10 |
13622. **THERMOMETER, Solid Stem, Engraved Scale, for Distillation of Gasoline**, graduated to read from 0° to 270° C. Made according to specifications of the United States Bureau of Mines. (See Technical Paper 166, May 1917, page 21)..... 4.15
13624. **THERMOMETER, Solid Stem, Engraved Scale**, same as No. 13622, but graduated from 20° to 520° F. in 2° divisions..... 4.15
9663. **THERMOMETERS, Solid Stem, Engraved Scale, for Flash Test**, for use in oil cup of No. 9662 Bureau of Mines Flash Tester. Graduated in ½ degree divisions.
- | | | |
|-----------------------|------|--------|
| No. | A | B |
| Range, degrees C..... | 0-50 | 40-110 |
| Each | 8.25 | 8.25 |
9669. **THERMOMETERS, Solid Stem, Engraved Scale, for Flash Test**, for use in oil cup of No. 9663 Bureau of Mines Flash Tester. With round bulb, graduated in 1 degree divisions.
- | | | | |
|-----------------------|---------|---------|---------|
| No. | A | B | C |
| Range, degrees C..... | 100-210 | 200-310 | 300-410 |
| Each | 8.25 | 8.25 | 9.90 |



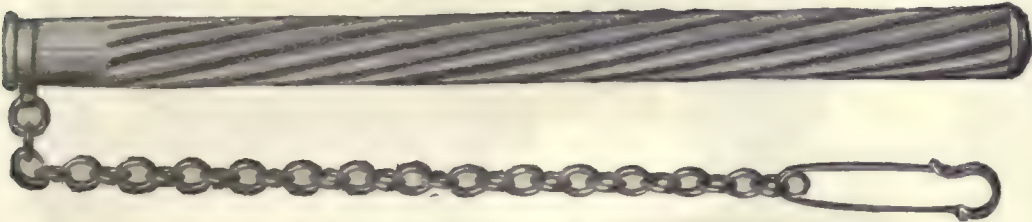
No. 13636.



No. 13640.



No. 13652.



No. 13658 (case only).



No. 13658 (glass tube only).

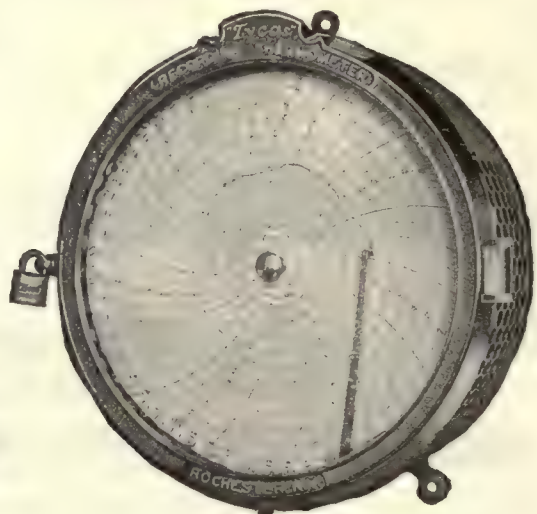


No. 13662.

13634. THERMOMETER, Solid Stem, Engraved Scale, for Flash and Fire Test, for low flashing oils. Graduated from -10° to 110° C., in 1° divisions. According to the specifications of the American Society for Testing Materials. Length, 12 inches..... \$2.50
13636. THERMOMETERS, Solid Stem, Engraved Scale, for Flash and Fire Test, pointed for 1 inch immersion. Length, 15 inches. No. A B C D E F G
Range, 20° to, degrees F..... 220 300 400 500 600 720 760
Size of subdivisions, degrees F..... 1 1 2 2 2 2 2
Each 2.50 2.65 3.30 3.95 4.62 4.95 5.80
13640. THERMOMETERS, Solid Stem, Engraved Scale, for Viscosity, graduated in $1/5^{\circ}$ divisions. Length, 8 inches. No. A B C
Range, degrees F..... 98 to 108 128 to 138 208 to 218
For measuring viscosity at, degrees F..... 100 130 212
Each 5.00 5.00 5.00
13642. THERMOMETERS, Solid Stem, Engraved Scale, for Viscosity, graduated in 1° divisions. Length, 8 inches. No. A B C D E
Range, degrees F..... 55 to 110 80 to 110 100 to 150 100 to 220 180 to 220
Each 2.50 2.50 2.50 2.50 2.50
9762. THERMOMETERS, Solid Stem, Engraved Scale, for use with No. 9760 Saybolt Viscosimeter. No. A B C
Range, degrees F..... 70 to 110 100 to 140 180 to 220
Each 3.60 3.60 3.60
9767. THERMOMETER, Solid Stem, Engraved Scale, for use with No. 9766 Scott Viscosimeter. Graduated from 50° to 120° F., in $1/5^{\circ}$, for use with lubricating oils..... 8.25
9664. THERMOMETER, Solid Stem, Engraved Scale, for Water Bath of No. 9662 Bureau of Mines Flash Tester. Graduated from 0° to 85° C., in 1° divisions. With cylindrical bulb..... 8.25
13652. THERMOMETER, Solid Stem, Engraved Scale, for Wax Test, graduated from 80° to 150° F., in $1/4^{\circ}$ divisions, for determining the melting point of waxes, paraffines, and greases. Length, 10 inches 3.30
13658. THERMOMETER, Pocket, Solid Stem, Engraved Scale, in spiral-ribbed aluminum case. Length, 5 inches. Range, 0° to 220° F., in 2° divisions 2.50
13660. THERMOMETER, Pocket, same as No. 13658, but with Centigrade scale. Range, 0° to 100° C., in 1° divisions 3.00
13662. THERMOMETER, Pocket, Maximum Registering, Solid Stem, Engraved Scale; in aluminum case. Length, 5 inches. Range, 0° to 220° F., in 2° divisions..... 4.15
13663. THERMOMETER, Pocket, Maximum Registering, same as No. 13662, but with Centigrade scale. Range, 0° to 100° C., in 1° divisions..... 4.15



No. 13666.



No. 13670.

13666. **THERMOMETERS, Recording**, with clock movement for revolving the chart, and a steel coil spring for actuating the recording pen arm; a flexible connecting tube through which the action of the mercury in expanding or contracting is transmitted from the sensitive element (the bulb) to the coil spring; and a bulb or sensitive element which is inserted at the point whose temperature is to be determined. The spring, the steel connecting tube, and the bulb are welded together, forming a hermetically sealed mercury filled system. In black enameled iron case, with nickel-plated ring, complete with 100 charts divided for making one revolution in seven days, extremely sensitive bulb 18 inches long, 10 feet of flexible protected capillary tubing (in case a greater length of tubing is desired, state exact length in order and add 40c per foot for each foot over 10) and supply of ink and pens.

No.	A	B	C	D
Range	-40° to 120°F.	30 to 230°F.	-20 to 60°C.	200 to 1000°F.
Size of subdivisions, degrees.....	2	5	1	10
Each	\$60.00	60.00	60.00	60.00

Note:—Thermometers of other ranges will be furnished on application; also for 24 hours instead of seven days.

13667. **CHARTS** for No. 13666, 8 inches in diameter, for 7 day period.

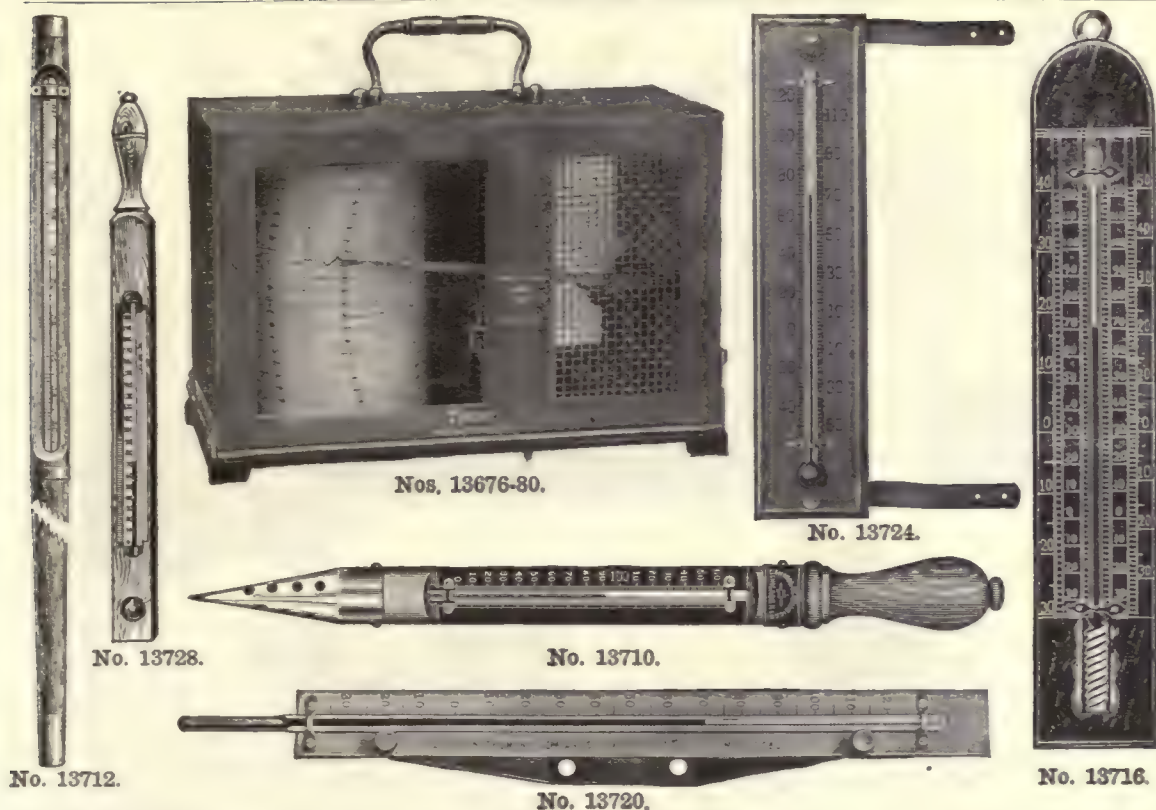
No.	A	B	C	D
Per hundred	1.75	1.75	1.75	1.75

13670. **THERMOMETER, Recording, Self Contained**, for obtaining continuous weekly records of weather, room or incubator temperatures. The case is 12 inches in diameter, finished in weather-proof black, with polished bronze hinged front. Range, 0° to 130°F. in 2° divisions. Complete with lock and key, one hundred 7-day charts and bottle of special recorder ink. 50.00

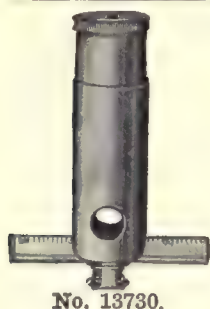
13671. **CHARTS** for No. 13670.....Per hundred 3.30

13676. **THERMOMETER, Recording (Thermograph)**. Made in America. A most accurate thermometer which will not vary its standard for years. A complete record is given by a pen upon a printed chart for an entire week, and by its form the exact thermometric reading can be seen at any moment, as well as the varying line traced by the pen for the time preceding. The charts are changed at the beginning of each week and can be retained as a record for the entire year. Mechanism consists of a spiral lamina of non-rusting material, which is exposed to the atmosphere at the end of the case. It is extremely sensitive and, having no levers in its construction, is very rigid. In non-corrosive metal case with glass front and screened openings on three sides about the lamina, and with storage space for charts. Range, 0° to 100° F. in 2° divisions. May ordinarily be used for any range of 100° F. between -20° and + 250° by means of No. 13683 Unfigured Charts. Complete with full directions for use, charts for one year, pen and ink..... 50.00

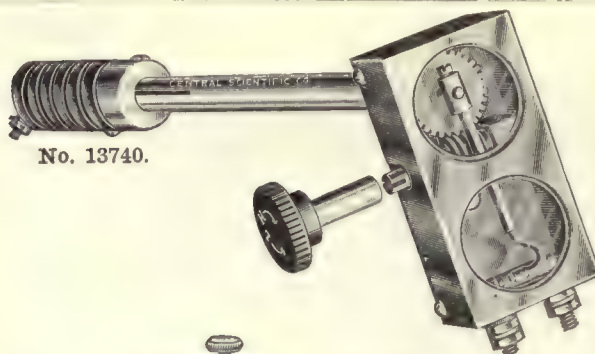
(For illustration of No. 13676, see page 499.)



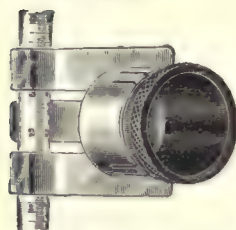
13678. **THERMOMETER, Recording (Thermograph).** Same as No. 13676, but with charts from 20° to 120° F. \$50.00
13680. **THERMOMETER, Recording (Thermograph).** Same as No. 13676, but with unfigured charts for a range of 100° F. in 2° divisions. 50.00
13681. **THERMOGRAPH CHARTS, 0° to 100° F.,** for use with No. 13676. In boxes containing a year's supply Per box 2.00
13682. **THERMOGRAPH CHARTS, 20° to 120° F.,** for use with No. 13678. In boxes containing a year's supply Per box 2.00
13683. **THERMOGRAPH CHARTS, Unfigured,** for use with No. 13680. Range, 100° F. in 2° divisions. In boxes containing a year's supply. Per box 2.00
13689. **THERMOGRAPH CHARTS,** for use with old style imported high drum thermographs. Style No. 46. Range -62° to +128° F. In boxes containing a year's supply. Per box 2.25
13691. **THERMOGRAPH CHARTS,** for use with old style imported low drum thermographs. Style No. 37. Range 0° to 100° F. In boxes containing a year's supply. Per box 2.50
13697. **BARO-THERMOGRAPH CHARTS, Style No. 20.** In boxes containing one year's supply. Per box 3.00
13710. **THERMOMETER, Soil, Standard Grade,** magnifying tube, mercury-filled, mounted on 15 inch turned mahogany frame with oxidized brass scale, and with pointed metal end. Range, -30° to 180° F. 2.30
13712. **THERMOMETERS, Soil, as used by the New York Agricultural Experiment Station.** With solid stem engraved scale thermometer mounted in turned wood case with upper part cut away to expose 10 inches of the scale from about 20° to 120° F. Both ends are protected by metal ferrules.
- | No. | A | B | C |
|--------------------------------|------|------|-------|
| For use at depth, inches. | 12 | 24 | 36 |
| Each Per box | 9.00 | 9.50 | 12.50 |
13716. **THERMOMETER, Three Scale,** boxwood, F., R. and C. scales.80
13720. **THERMOMETER, Weather Bureau Standard,** 12 inch, cylindrical bulb, graduation etched on tube. The tube is mounted on an aluminum scale on which is marked every 5 degree line of the scale, and the figures every 10 degrees. Has brass insulating support and binding screws. Approximate range, -30° to 120° F. With manufacturer's certificate 6.00
13724. **THERMOMETER, Window,** for weather observations, with magnifying tube, alcohol filled, mounted on nickel-plated metal back, with brackets for attachment to window frame. Length, 10 inches; approximate range, -40° to 120° F. 1.20
13728. **THERMOMETER, Wood Frame,** with solid stem, engraved scale thermometer. Floats horizontally in liquids. No metal to corrode. Length, 12 inches; range, about -20° to 120° F.80



No. 13730.



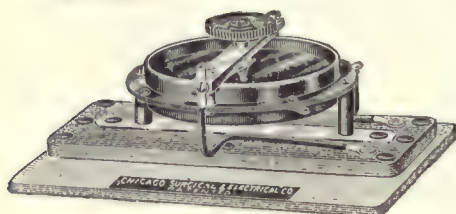
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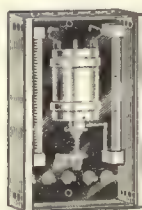
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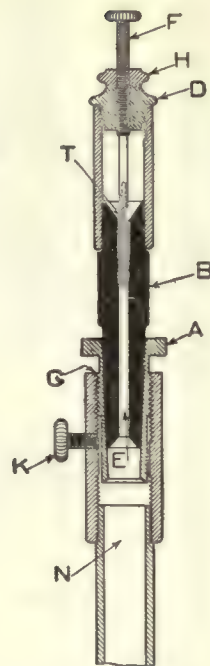
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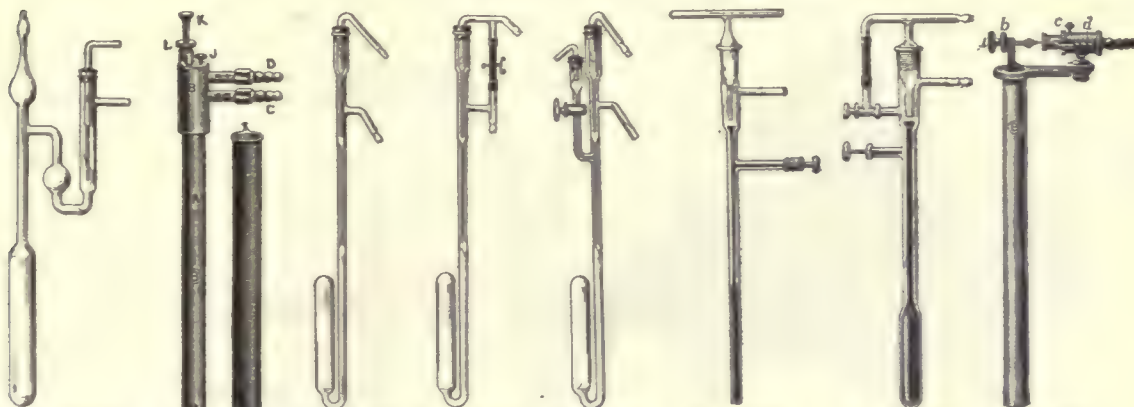


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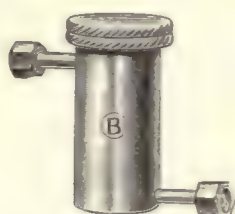


No. 13744.

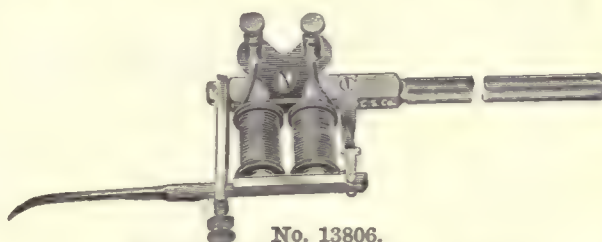
13730. **THERMOMETER READING ATTACHMENT**, designed especially for use with Calorimeter Thermometers. Supported by the thermometer stem, thereby maintaining a constant angle of vision over the whole scale..... \$3.00
13731. **THERMOMETER READING ATTACHMENT**, same as No. 13730, but without support... 2.00
1984. **THERMOMETER READING ATTACHMENT**, consisting of a nickel-plated brass clamp to fasten on the thermometer stem with an adjustable eyepiece 2.00
13740. **THERMO-REGULATOR, Electric, DeKhotinsky Bimetallic**, made from invar-brass ribbon. It can be set at any desired temperature from that of the surrounding atmosphere or less, to 250° C. or higher if necessary. The precision of action of this thermo-regulator is 1/4° C. No relay is required in connection with it. Maximum capacity, 1 1/2 amperes..... 10.00
13744. **THERMO-REGULATOR, Electric, DeKhotinsky Standard**, for precision work in temperature control of water baths, thermostats, etc. It possesses a number of advantages over the usual form. To reduce the lag and to make it respond quickly to changes of temperature it is made of steel, which has about 66 times the thermal conductivity of glass, and is filled with mercury which has about 60 times the conductivity of toluene, which is often used to fill thermo-regulators. Attached to this steel tube is a regulating cap provided with a platinum point, which makes contact with the surface of the mercury in a small glass capillary tube, so that the contact is visible. This capillary is ground to fit exactly the metal parts of the head so that the platinum contact point is exactly centered. When the regulator is to be used in water it must be ordered enclosed in a thin-walled brass tube to prevent rust. The sensitiveness of this thermo-regulator depends solely on the relation between the diameter of the capillary and the capacity of the steel tube and is almost unlimited. A relay must be used in connection with this thermo-regulator, as the current which passes through the mercury-platinum contact must be kept infinitesimally small. Price dependent upon length and accuracy required.
- In ordering, specify the capacity of the bath, depth of water, kind of current and accuracy of regulation desired.
13748. **RELAY, DeKhotinsky Iron Clad**, for use with No. 13744 for accurate temperature regulation. This must be ordered in connection with No. 13744, and the same information must be furnished. When ordered, complete directions will be furnished including a wiring diagram showing all connections to be made. Price dependent upon conditions to be met.
13754. **THERMO-REGULATOR, Electric, simple form**, consisting of a strip of hard rubber and metal riveted together, the difference in their expansion causing the strip to bend, thus opening or closing an electric circuit through the platinum contact points. Useful as a fire alarm, and in roughly controlling the temperature in hot-houses, incubators and other places where a constant temperature is essential..... 2.25
13756. **THERMO-REGULATOR, Electric, with condenser**, for use in incubators. Will control temperatures automatically to 1/2° C., through a range from 30° C. to 60° C. Very simple in construction and constant in operation. For full description, see No. 7908..... 11.00



No. 13762. No. 13766. No. 13770. No. 13772. No. 13774. No. 13778. No. 13780. No. 13784.



No. 13786.

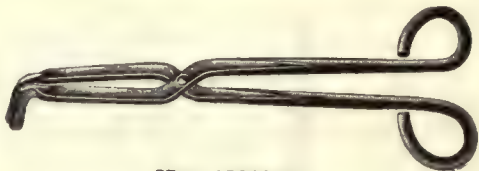


No. 13806.

13762. **THERMO-REGULATOR, Gas, Dunham's**, of glass, for regulation of gas flame. Without mercury \$2.00
13766. **THERMO-REGULATOR, Gas, Greenman Mercury**, constructed entirely of steel, widely used in connection with Greenman Burner No. 2102 for heating and regulation of incubators. A brass jacket is supplied for the thermo-regulator which is to be filled with glycerine. Length of thermo-regulator tube, 10 inches; diameter of outer jacket, 1 inch. With inlet and outlet tubes threaded with $\frac{1}{8}$ inch iron pipe thread for permanent connection with gas supply. Without mercury 13.20
13770. **THERMO-REGULATOR, Gas, Mercury-Toluene type**, of glass. Length, about 12 inches. 2.50
13772. **THERMO-REGULATOR, Gas**, same as No. 13770, but with a by-pass to keep flame burning. Without screw clamp 3.00
13774. **THERMO-REGULATOR, Gas**, same as No. 13770, but with reservoir and glass stop-cock to vary the amount of mercury..... 7.50
13778. **THERMO-REGULATOR, Gas, Reichert's**, of glass with brass adjusting screw. Length, $9\frac{1}{2}$ inches 4.80
13780. **THERMO-REGULATOR, Gas, Reichert's improved**, with stop-cock to prevent extinguishing the flame 6.00
13784. **THERMO-REGULATORS, Gas, Roux Bimetallic**, operating without the use of mercury or glass. Diameter of tube, 1 inch.
Length, inches 10 12
Each 9.90 10.65
13786. **GAS FILTER ATTACHMENT**, for use with Nos. 13766 and 13784, for cleaning the illuminating gas of coal tar and other impurities..... 5.40
For **GAS PRESSURE REGULATOR** for use with **Thermo-Regulators**, see No. 7070.
THERMOS BOTTLES, see **Vacuum Bottles**.
THERMOSTATS, see **Physical Chemistry Apparatus**.
THISTLE TUBES, see **Funnel Tubes**.
13792. **THREAD, Cotton, White, No. 70**, in spools of 150 yards..... Per spool .10
Per dozen 1.00
13794. **THREAD, Linen, Black, No. 30**, in spools of 200 yards..... Per spool .40
Per dozen 4.00
13796. **THREAD, Silk, Black, No. A**, in spools of 50 yards Per spool .10
Per dozen 1.00
13500. **THUMB TACKS**, stamped steel, made of one piece, head $\frac{5}{16}$ inch..... Per dozen .09
13806. **TIME MARKER, Electrically Operated**, with aluminum stylus, for use in connection with No. F783 Metronome (or other periodic circuit breaker) and a Kymograph (see No. F6065). Mounted on a 10 mm rod 22 cm long, for clamping to any support. Small and compact; positive in action 6.75



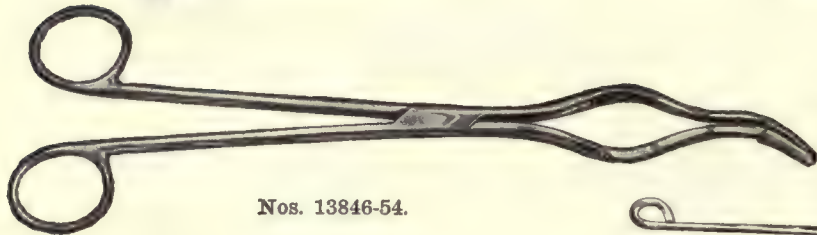
No. 13810



Nos. 13818-20.



Nos. 13824-32.



Nos. 13846-54.



No. 13858.



No. 13862.



No. 13864.

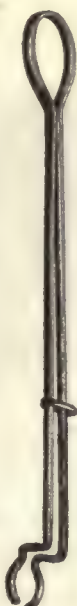
13810. **TIME SWITCH**, for automatically disconnecting electrically operated instruments from the circuit at the expiration of a given interval of time. Consists of a single pole knife switch operated by a No. 3000 Interval Clock which may be set to throw the switch at the end of any interval from $\frac{1}{4}$ minute up to 2 hours. For use in circuits up to 15 amperes. Convenient for use with electric centrifuges, incubators, sterilizers, shakers, etc. Complete as illustrated, mounted on slate base with binding posts..... \$10.00

TIN BOXES, see Boxes.

13818. TONGS, Crucible, Single Bent, brass, with riveted joint.	Length, 9 inches.....	.65
13820. TONGS, Crucible, Single Bent, brass, nickel-plated, with riveted joint.	Length, 9 inches.....	.95
13824. TONGS, Crucible, Double Bent, brass, with riveted joint.	Length, 9 inches.....	.35
13826. TONGS, Crucible, Double Bent, brass, nickel-plated, with riveted joint.	Length, 9 inches.....	.50
13830. TONGS, Crucible, Double Bent, steel, with riveted joint.	Length, 9 inches.....	.20
13832. TONGS, Crucible, Double Bent, steel, nickel-plated, with riveted joint.	Length, 9 inches.....	.30
13836. TONGS, Crucible, Double Bent, forged steel, nickel-plated, with lock joint.	Length, 10 inches. With corrugated tips.....	3.00
13840. TONGS, Crucible, Double Bent, solid nickel, with riveted joint.	Length, 9 inches.....	1.00
13842. TONGS, Crucible, Double Bent, solid nickel, with nickel-chromium tips, electrically welded on.	The tips take on an adherent coating which protects hot platinum with which they come in contact. With riveted joint.....	3.25
13846. TONGS, Crucible, Double Bent, steel, nickel-plated with solid platinum tips; lock joint.	Length, 8 inches. Price varies with market price of platinum.	
13850. TONGS, Crucible, Double Bent, solid nickel, with solid platinum tips; lock joint.	Length, 8 inches. Price varies with market price of platinum.	
13854. TONGS, Crucible, Double Bent, forged steel, nickel-plated with solid Palau tips; lock joint.	Length, 10 inches. Weight of Palau tips, about 4 grams.....	16.50
13858. TONGS, Crucible, Double Bent, steel, nickel-plated, with riveted joint.	For use in handling crucibles and dishes in muffle furnaces. Length, 18 inches.....	3.00
13862. TONGS, Crucible, Single Bent, malleable iron, for heavy crucibles.	Length, inches.....	12 17
	Each.....	1.50 1.65
13864. TONGS, Crucible, Double Bent, wrought iron, for heavy crucibles.	Length, 30 inches...	1.80



No. 13866.



No. 13870.



No. 6020.



No. 13876.



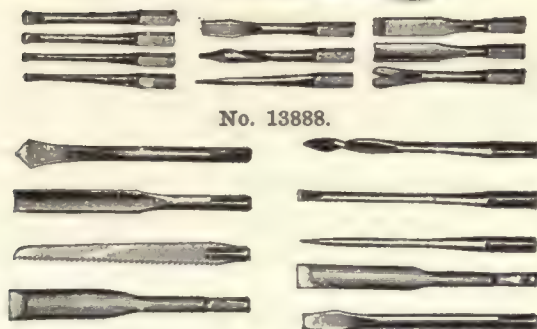
No. 13878.



No. 13882.



No. 13888.

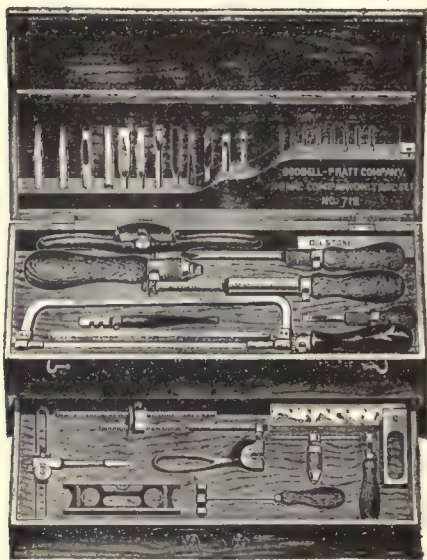


No. 13890 (Tools only).

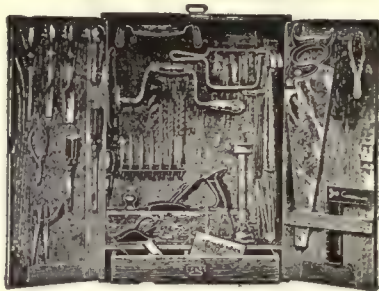


No. 13894.

13866. **TONGS, Crucible, Double Bent, wrought iron**, for lifting heavy crucibles vertically. Length, 33 inches. For crucibles up to 4 inches. **\$1.80**
13870. **TONGS, Crucible, Julian's, steel, nickel-plated**, for handling crucibles in a muffle furnace. Length, 20 inches **2.50**
6020. **TONGS, Cylinder or Crucible, with curved jaws**. Designed especially for use with No. 5906 Baking Cylinder. Length, 24 inches. **1.10**
13876. **TONGS, Cupel, steel, with bent flat ends**. Length, 30 inches. **1.25**
13878. **TONGS, Cupel, steel, with curved ends**. Length, 30 inches. **1.25**
- TONGS, Gas, see Pliers.**
13882. **TONGS, Scorifier, spring steel, light**. Length, 30 inches. **1.25**
13888. **TOOL HOLDER**, with hollow wood handle and ten enclosed tools. Length of holder over all, 6 inches. Length of tools, 2½ inches. **.60**
13890. **TOOL HOLDER**. Handle similar to that of No. 13888, but larger and better finished. Has 9 tools, as shown in the illustration. Length of handle over all, 7 inches. Length of tools, 3¾ inches **1.60**
13894. **TOOL SET in Case** of polished hardwood, 16x8½x3½ inches, containing 6-in. and 1½-in. ratchet screw drivers, hand shave, hack saw frame with 11 blades and one bone saw, glass cutter, wood handle automatic drill, tool handle with 9 tools, nail set, prick punch, saddlers' drive punch, solid punch, and oil stone. **11.00**



No. 13896.

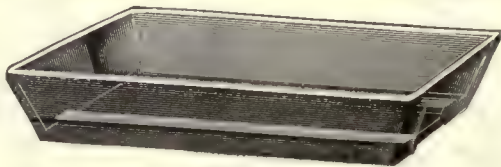


No. 13900.



No. 13932.

No. 13934.



No. 13914.

13896. **TOOL SET in Case** of polished hardwood, 16x8½x5½ inches, containing 6-in. steel try square, 6-in. iron level, double beam roller gauge, washer cutter, gunsmiths' screw driver, tool holder for small square shank tools, brass hammer, lever metal punch, 6-in. and 1½-in. ratchet screw drivers, hand shave, hack saw frame with 11 blades and one bone saw, glass cutter, wood handle automatic drill, tool handle with 9 tools, nail set, prick punch, saddlers' drive punch, solid punch, and oil stone..... \$18.70

13900. **TOOL SET in Chest** of chestnut, panelled and nicely finished. Contains the following high grade tools.
Panel saw, brace, 3 gimlet bits, 3 auger bits, 3 chisels, 2 screw drivers, hack saw frame, pocket level, countersink, scraper, hammer, tack hammer, tool handle with 10 tools, spoke shave, block plane, jack plane, 2-foot rule, try square, marking gage, nail sets, wing dividers, gas pliers, flat nose pliers, nippers, saw file, oil stone, oil can, can of glue, and coping saw. Weight, 55 lbs. 27.00

TOOLS, Miscellaneous, see various headings, as **Calipers, Pliers, Hammers**, etc.

13906. **TOWELLING**, Crash, good quality, 16 to 17 inches wide, in bolts of 50 yards.... Per yard .17
TRANSITE, see **Asbestos Slate**. Per bolt 7.50

TRANSITS, see **Surveying Instruments**.

TRAYS, Germinating, see **Grain-Testing Apparatus**.

13914. TRAYS, Glass, Photographic , of clear flint glass.					
No.	A	B	C		
Size, inches	4½x5½	5½x8½	8½x10½		
Each .....	.27	.30	.70		

13916. **TRAY, Glass, heavy**, 6x8x1½ inches deep..... .30

13920. TRAYS, Metal, Photographic , wire bound and coated with acid-proof japan.					
No.	A	B	C	D	E
Size, inches	5½x8½	7x9	8x10	10x12	16x20
Each .....	.40	.45	.60	.90	2.50

TRAYS, Sampling, see **Sampling Apparatus**.

TRAYS, Slide, see **Microscope Accessories**.

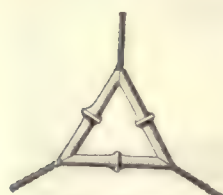
TRAYS for Soil Analysis Work, see **Soil Analysis Apparatus**.

TRIANGLES, Draftsman's, see **Drawing Instruments**.

TRIANGLES, Glass Dessicator, see No. 3804.

13932. TRIANGLES, iron wire, twisted .				
No.	A	B	C	
Length of side, inches.....	1½	2	2½	
Each .....	.05	.05	.05	
Per dozen .....	.40	.40	.40	

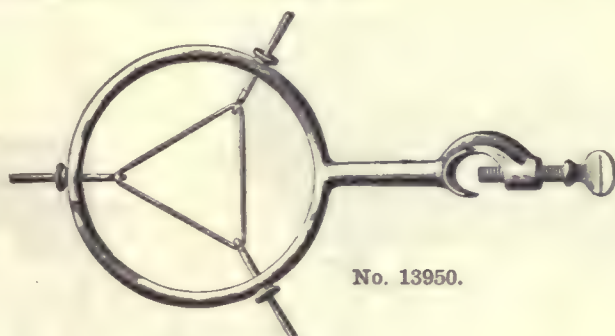
13934. TRIANGLES, iron wire covered with pipe stems .				
No.	A	B	C	D
Length of side, inside, inches.....	1½	2	2½	3
Each .....	.07	.07	.08	.08
Per dozen .....	.65	.70	.75	.80



No. 13936.



No. 13942.



No. 13950.



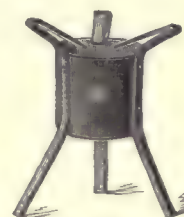
No. 13956.



No. 13958.



No. 13960.



No. 13966.

13936. **TRIANGLES**, iron wire covered with pipe stems having raised centers, so that the crucible rests on these points.

No.	A	B	C
Length of side, inside, inches.....	2	2½	3¼
Each	\$0.09	.10	.12
Per dozen .....	.90	1.00	1.20

13940. **TRIANGLES**, Nichrome wire, melting point about 3000° F., non-corrodible, costing but one-sixteenth as much as platinum and lasting longer in service.

No.	A	B	C	D
Length of side, inside, inches.....	1½	2	2½	3
Each .....	.16	.16	.22	.22

13942. **TRIANGLES**, Nichrome wire, covered with fused silica tubes, superior to any triangles yet produced.

No.	A	B	C	D
Length of side, inside, inches.....	1½	2	2½	3
Each .....	.31	.31	.44	.50

13944. **TRIANGLES**, Hoskins' Chromel, made of heavy square-section wire, free from iron, and highly resistant to acids, oxidation, and fusion.

No.	A	B	C	D
Length of side, inside, inches.....	1½	2	2½	3
Each .....	.28	.28	.40	.40

TRIANGLES, Platinum, see Platinum Ware.

13950. **TRIANGLE HOLDER**, adjustable, for Triangles No. 10842, with clamp for attaching to support

1.25

13956. **TRIPODS**, iron, small, for alcohol lamps. Height, 6 inches; diameter, 3¼ inches.....

.25

13958. **TRIPODS**, iron, japanned, with easily removable legs and wide rim. Height, 9 inches.

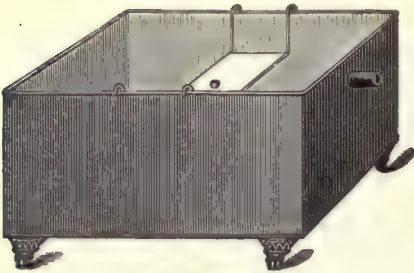
Diameter, outside, inches.....	5	6	8	10	12
Each .....	.30	.35	.45	.60	.70

13960. **TRIPODS**, iron, japanned, same as No. 13958, with concentric rings.

No.	A	B	C	D	E
Diameter, outside, inches.....	5	6	8	10	12
Number of rings.....	2	3	4	5	6
Each .....	.35	.50	.70	1.00	1.30

13966. **TRIPODS**, iron, with sheet iron chimney, for protecting burner flame from drafts. Height over all, 9 inches.

Diameter, inches	3½	5	6
Each .....	.90	1.10	1.50



Nos. 13972-78.



No. 13980.



No. 13990.



No. 13992.



No. 14006.



No. 14008.



No. 14010.



No. 14012.



No. 14022.

13972. **TROUGH**, Pneumatic, of japanned tin with sliding shelf and overflow; students' size, 4½x6½x10 inches. **\$0.70**
13974. **TROUGH**, Pneumatic, of heavy japanned tin with sliding shelf and overflow, 6x11x16 inches 1.60
13978. **TROUGH**, Pneumatic, heavy galvanized iron with sliding shelf and overflow, 5x9x12 inches. 1.00
13980. **SUPPORT**, Beehive, for use with Nos. 13972 to 13978, for supporting the inverted receptacle in collecting gases; of zinc, 3 inches in diameter40
13988. **TROWEL**, 6 inch cold rolled steel blade, with malleable iron shank firmly riveted on and wood handle12
13990. **TROWEL**, best quality, with 6 inch blade made of one solid piece of steel, with wood handle. Will outwear all others..... .55
13992. **TROWEL**, Transplanting or Collecting, with narrow and deeply curved blade 6 inches long, and wood handle. Useful with the collecting case or as a transplanter, dibber, or weed digger .15
- T SQUARE**, see **Drawing Instruments**.

TUBES, ALL KINDS

- TUBES**, Absorption, see **Absorption Tubes**.
- TUBE**, Air Thermometer, see **Air Thermometer Tubes**.
- TUBES**, Arsenic, see **Arsenic Tubes**.
- TUBES**, Calcium Chloride, see **Calcium Chloride Tubes**.
- TUBES**, Centrifuge, see **Centrifuge Accessories**.
- TUBES**, Color, see **Colorimetric Apparatus**.
- TUBES**, Combustion, see **Combustion Tubes**.

TUBES, Connecting, Brass. Approximate length of arms, 1¼ inches.

No.	A	B	C
Diameter, outside, inches.....	5/16	3/8	1/2
Diameter, inside, approx., inches.....	3/16	5/16	7/16
14000. TUBES , T shape.....	.40	.60	.70
14002. TUBES , Y shape.....	.40	.60	.70

TUBES, Connecting, Glass.

No.	A	B	C	D	E
Diameter, outside, mm.....	5	7	8	10	12
Diameter, inside, mm.....	3	5	6	8	10
Approx. length of arms, mm.....	50	50	60	75	100
14006. TUBES , T shape.....	.10	.12	.20	.25	.40
14008. TUBES , U shape.....	.10	.12	.20	.25	.40
14010. TUBES , Y shape.....	.10	.12	.20	.25	.40

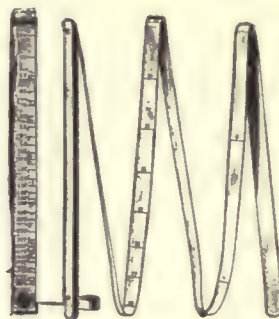
14012. **TUBE**, Connecting, Glass, T shape, with two stop-cocks. Diameter outside, 7 mm; inside, 5 mm. 3.00
14016. **TUBE**, Connecting, Lead, Y shape. Diameter outside, 8 mm; inside, 5 mm. Length of arms, about 1½ inches..... .30
14020. **TUBE**, Connecting, Hard Rubber, Y shape. Diameter outside, 8 mm; inside, 5 mm. Length of arms, about 1 inch..... .15
14022. **TUBE**, Connecting, Reducer, Brass, for connecting 7/16 inch to 9/32 inch tubing. Without threads.25



No. F3355.



No. 14030.



No. 3102.

TUBES, Culture, see Test Tubes.
TUBES, Drying, see Calcium Chloride Tubes.
TUBES, Fermentation, see Fermentation Tubes.
TUBES, Filtering, see Filter Tubes.
TUBES, Fractional Distillation, see Distilling Tubes.
TUBES, Fused Silica, see Combustion Tubes.
TUBES, Geissler, see Catalog F of Physical Apparatus.
TUBE, Hortvet, see Sugar Analysis Apparatus.
TUBES, Melting Point, see Melting Point Tubes.
TUBES, Phosphorus, see Centrifuge Accessories.
TUBES, Potato Culture, see Test Tubes.
TUBES, Pyrometer, see Pyrometer Protection Tubes.
TUBES, Transparent Quartz, see Combustion Tubes.
TUBES, Soil Sampling, see Soil Analysis Apparatus.
TUBES, Specimen, see Test Tubes.
TUBES, Test, see Test Tubes.
TUBES, Vacuum or Dewar, see Vacuum Tubes.
TUBES, Water Analysis Color, see Color Tubes.
TUBES, X Ray, demonstration form, see Catalog F of Physical Apparatus.
TUBING, Flexible Metallic, see Rubber Tubing.
TUBING, Rubber, see Rubber Tubing.
TUBING, SILICA, see Silica Tubing.
TUMBLERS, Glass, with lip, see Beakers.

F3355. TUMBLERS, Glass, Heavy, capacity, about 250 cc; diameter at top, 60 to 65 mm. each \$0.06
per dozen .60

TUMBLERS, Jelly, see Jars.

14030. TURBIDIMETER, Jackson's, for determining sulphates in water; consisting of a graduated tube
 22 cm long, with metal case to exclude the light, and a support for tube and candle... **14.00**

14031. CANDLES for use with No. 14030.....per dozen 3.00

14032. GRADUATED TUBES, extra, for No. 14030.

No.	A	B
Length, cm.	22	75
Each	2.50	5.00

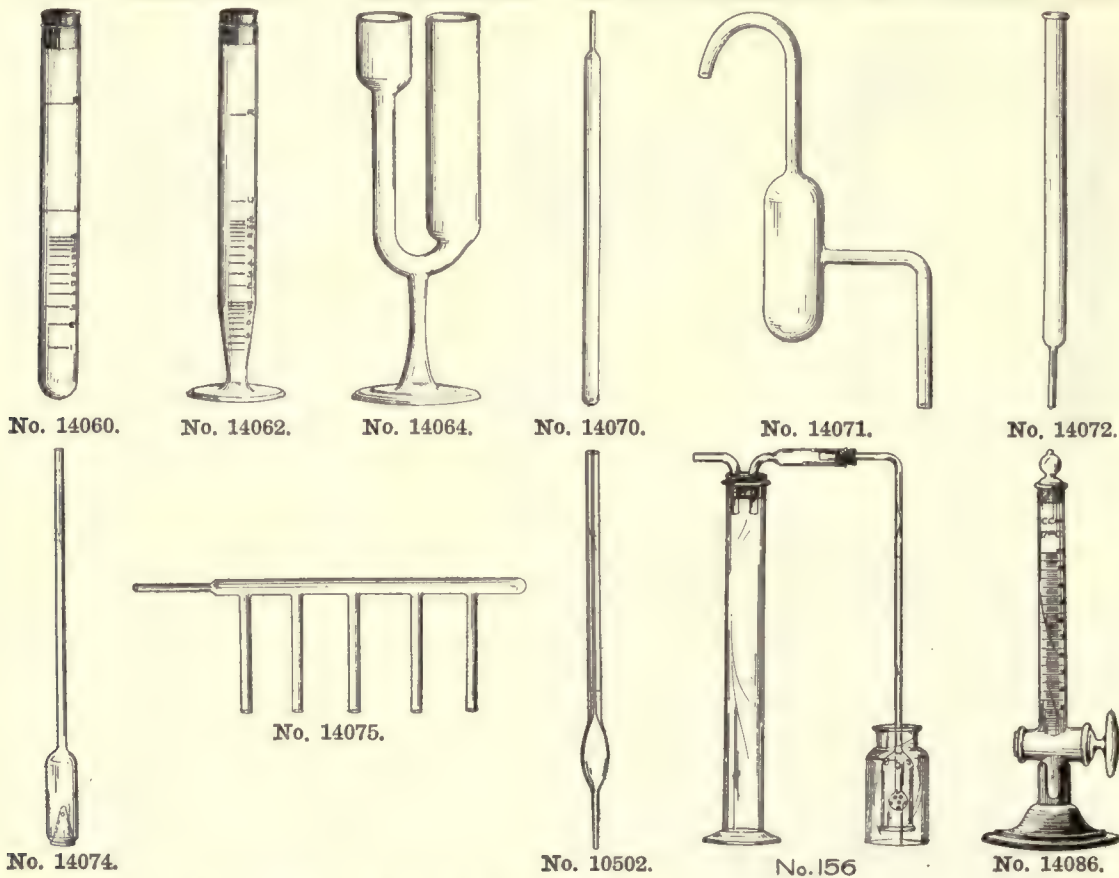
14033. BRASS EXTENSION for use with No. 14030 when using long graduated tubes..... 4.50

3102. TURBIDIMETER, United States Geological Survey Standard, made of aluminum, 8 inches long,
 graduated in parts per million. To one end is attached a tape 4 feet long, similarly graduated.
 Into the other end is fastened a nickel-plated brass screw eye containing a piece of rolled
 platinum wire to be viewed. The depth of its disappearance to the eye indicates the turbidity.
 Complete in case. (See Bulletin No. 151 of the United States Geological Survey)..... **7.50**

TWINE, Asbestos, see No. 312.

14038. TWINE, Cotton, 3-ply.....Per ball .16

14040. TWINE, Linen, No. 9, white.....Per ball .45

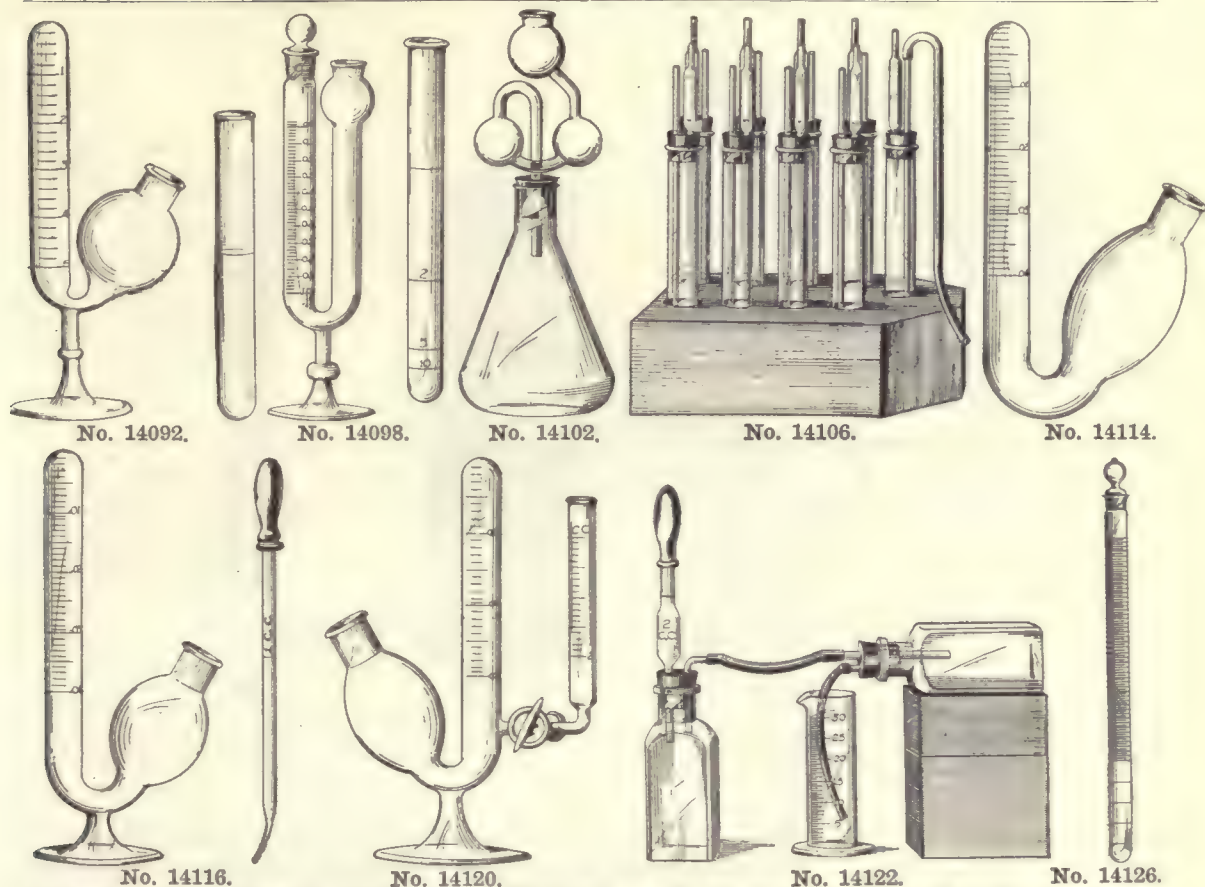


URINE ANALYSIS APPARATUS

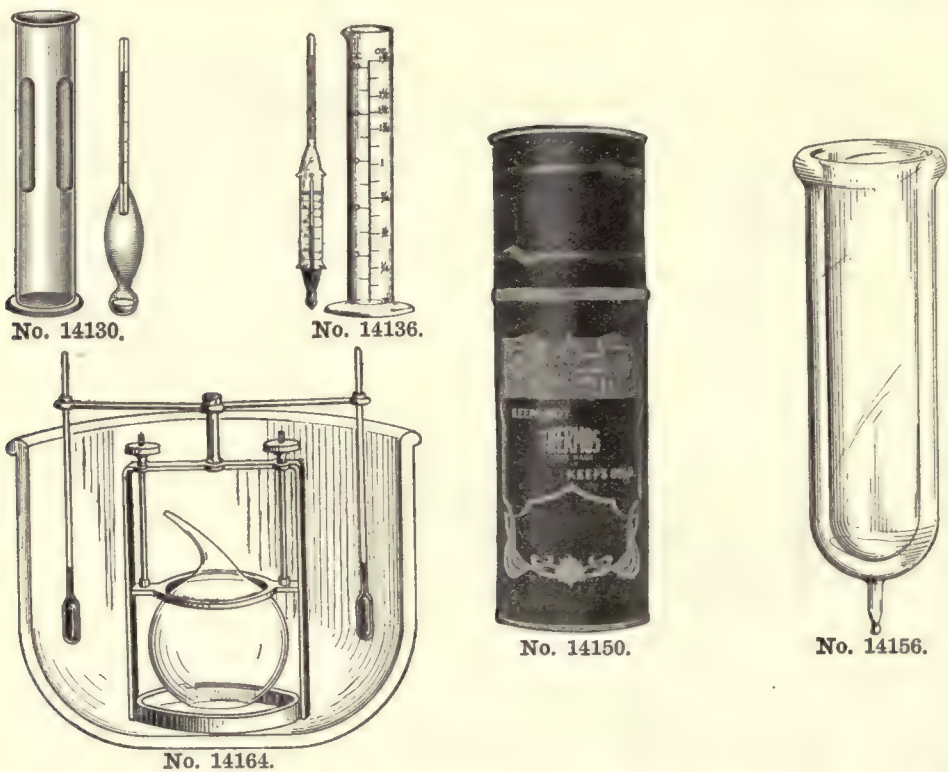
14060. ALBUMINOMETER, Esbach's, for the quantitative determination of albumin in urine; graduated to read grams of albumin per liter of urine. Complete with directions..... \$0.65
14062. ALBUMINOMETER, Esbach's, with pointed bottom, for testing small quantities, on foot 1.00
14064. ALBUMOSCOPE (Horismascope), for the detection of albumin in urine with nitric acid. With this instrument the nitric acid comes in contact with the urine in full strength, thus rendering the test much more delicate than ordinarily, 1/60 per cent. of albumin being detectible. Complete with directions for use..... 1.25
14066. FEHLING'S SOLUTION, tablet form for use in Urine Analysis, sufficient to make one ounce of solution25

FOLIN'S APPARATUS FOR THE DETERMINATION OF AMMONIA, TOTAL NITROGEN AND UREA IN URINE

- (See Journal of Biological Chemistry, Vol. XI, No. 5. for June 1912.).
14070. AMMONIA ABSORPTION TUBE, small, with perforated end, 265 x 8 mm..... .20
14071. AMMONIA TRAP, Glass50
14072. CONDENSER TUBE, for urea, 250 x 15 mm..... .30
14074. FUME ABSORPTION TUBE, straight, for bending to desired shape in the laboratory... .60
14075. CONNECTING TUBE or Manifold for use with No. 14074 Absorption Tubes.
- | | | | |
|---------------------|-----|------|------|
| No. | A | B | C |
| Number of arms..... | 4 | 5 | 6 |
| Each | .90 | 1.00 | 1.20 |
10502. OSTWALD PIPETTES, graduated to deliver exact amounts at 20°C. Capacity, cc
- | | | |
|------------|------|------|
| Each | 1 | 2 |
| ..... | 1.00 | 1.00 |
- 13364E. TEST TUBE, non-corrosive glass, 200 x 25 mm..... .15
14078. TEMPERATURE BULB, filled with mercury chloride-iodide40
156. AMMONIA ABSORPTION APPARATUS, Folin's, complete with cylinder, two hole rubber stopper, drying tube, Folin Absorption Tube No. 157 and bottle..... 3.25
157. AMMONIA ABSORPTION TUBE only of No. 156 1.60
14086. PURINOMETER, Hall's, for the quantitative determination of purin nitrogen in urine. With glass stop-cock, glass stopper and wooden base, graduated from 0 to 100 cc in 1 cc..... 10.00
14087. TEST SOLUTION No. 1, for use with No. 14086..... per 6 oz. bottle .50
14088. TEST SOLUTION No. 2, for use with No. 14086..... per 6 oz. bottle .55



14092. **SACCHAROMETER, Einhorn's Fermentation**, for the estimation of sugar in urine. Consists of a graduated fermentation tube on foot and a graduated test tube. The percentage of sugar is read directly on the tube..... \$0.75
14093. **GRADUATED TEST TUBE** only for No. 14092..... .30
14096. **SACCHAROMETER, Einhorn's Fermentation**, set of two, one for the urine under examination, the other for normal urine to which glucose has been added to test the efficiency of the yeast used. With graduated test tube..... 2.00
14098. **SACCHAROMETER, Lohnstein's** for the accurate determination of sugar in diluted urine. Complete with graduated test tube, in case with directions for use..... 2.50
14102. **UREA APPARATUS, Folin**, for the determination of urea in urine, consisting of an Erlenmeyer flask with one-hole rubber stopper, and special urea bulb..... 1.75
14103. **UREA BULB** only for No. 14102..... 1.20
14106. **UREA APPARATUS, Van Slyke-Cullen**, for the determination of urea in blood and urine. The apparatus consists of 9 heavy walled glass test tubes fitted with two-hole rubber stoppers, through which are inserted Folin Ammonia Absorption Tubes and connecting tubes, mounted in a heavy wooden block. Complete with rubber connecting tube, brass Filter Pump No. 5476A, Coupling No. 5480A, and a 5 gram bottle of urease. (See Journal of Biological Chemistry, Vol. XIX, page 211, 1914)..... 11.00
14107. **FOLIN AMMONIA TUBES** only of No. 14106..... each .55
14108. **CONNECTING TUBES** only of No. 14106..... each .20
14109. **TEST TUBES** only of No. 14106..... each .35
14110. **UREASE** for No. 14106..... per 5 gram bottle .75
14114. **UREOMETER, Doremus'**, for the rapid quantitative determination of urea in urine by the hypobromate method. Consists of a graduated pipette and a fermentation tube graduated to read to 1/10 per cent. Complete with directions for use..... 1.00
14116. **UREOMETER, Doremus'**, same as No. 14114, on glass foot..... 1.00
14117. **DROPPING PIPETTE** only for Nos. 14114 and 14116, graduated at 1 cc..... .15
5290. **SUPPORT, Hardwood**, with brass clips, for No. 14114..... 1.00
14120. **UREOMETER, Doremus'-Hinds**, with glass stop-cock and side tube graduated in tenths of a cc for delivering accurate amounts of urine without permitting the escape of gas from the bulb. On glass foot..... 3.60
14122. **UREOMETER, Squibb's**, for the approximate determination of urea in urine by displacement. Complete with 50 cc bottle of reagent, vials, graduated pipette, graduated cylinder, with directions for use..... 3.50
14126. **URICOMETER, Ruhemann**, for estimating directly the amount of uric acid in urine in parts per 1000..... 5.00



- 14130. **URINOMETER**, Squibb's, for the determination of the specific gravity of urine. Length, 5 inches. Graduated from 1.000 to 1.060. Guaranteed accurate for temperatures of 77° F. In case, with fluted cylinder and directions, without thermometer \$0.90
- 14132. **URINOMETER**, Squibb's. Same as No. 14130, but with thermometer in float body, with scale of corrections for temperature..... 4.50
- 14133. **CYLINDER** only of Nos. 14130 and 14132..... .35
- 14136. **URINOMETER**, small size, for testing 1 fluid-ounce or 30 cc samples. With specific gravity scale 1.005 to 1.035 in 0.001 graduations, with spines on body to prevent clinging to sides of jar. Complete with test jar graduated in 1/8 ounce and 5 cc divisions with lip..... 1.80
- 14138. **URINOMETER**, small size, same as No. 14136 with separate thermometer showing corrections for temperature 3.00

URINE SEDIMENT GLASSES, see Test Glasses.

- 14150. **VACUUM BOTTLES**, for keeping hot liquids hot and cold liquids cold, with re-enforced vacuum chamber. Supplied with large size drinking cup, securely fastened to the case, preventing leakage of the contents through loosening the cork. Finished in red japan, with nickeled top and base.

No.	A	B
Capacity	pint	quart
Each	1.75	2.75

- 14151. **GLASS BOTTLES** only for No. 14150, for replacement.

No.	A	B
Each	1.25	2.00

VACUUM PUMPS, see Pumps, Air.

VACUUM TUBES, Dewar's, double walled, for liquid air experiments.

No.	A	B	C	D
Length, outside, cm.....	10	20	30	35
Diameter, outside, cm.....	4.5	5.5	6.5	9
14154. TUBES, Silvered	4.00	5.40	11.00	19.50
14156. TUBES, Unsilvered	3.30	4.50	10.00	18.00

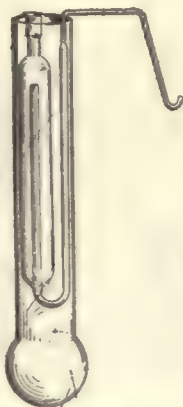
VALENCE BLOCKS, see Models.

VAPOR DENSITY APPARATUS

- 14164. **VAPOR DENSITY APPARATUS**, Dumas, complete with kettle and bulb support, but without thermometer or bulbs..... 15.00
- 856. **DUMAS BULBS** for No. 14164, capacity about 200 cc.....each .35



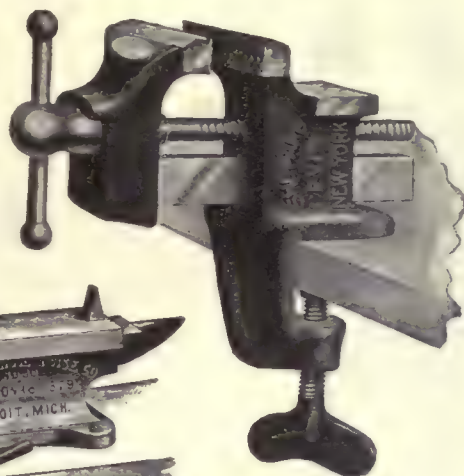
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No. 14178.

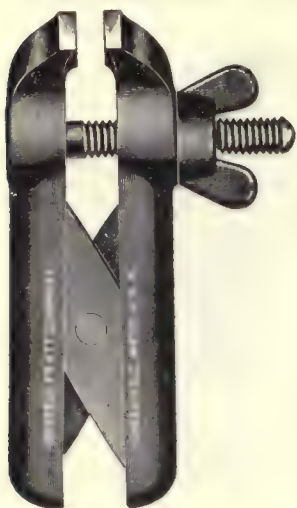


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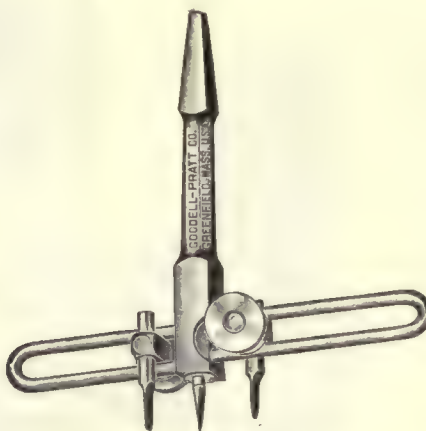


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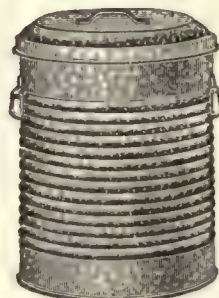
14170. **VAPOR DENSITY APPARATUS**, Victor Meyer, complete with outer jacket of glass, 25 inches long and $1\frac{1}{2}$ inches in diameter, inner tube 33 inches long, without bottle for containing the liquid to be tested. \$2.25
14171. **BOTTLES**, small, glass stoppered, for use with No. 14170. Each .30
Per dozen 3.30
14172. **INNER TUBE** only of No. 14170, with side arm 1.10
14173. **OUTER JACKET** only of No. 14170, of glass..... 1.25
14174. **OUTER JACKET** only of No. 14170, of copper, according to McCoy..... 6.00
14178. **VAPOR DENSITY APPARATUS**, Weiser's Modification of Victor Meyer's, designed to shorten the apparatus while retaining all the desirable features of the original. Length of outer jacket, 32 cm; diameter of outer jacket, 6 cm; capacity of vaporization bulb, about 125 cc. Complete as described with 2 glass stoppered bottles. (See Journal of Physical Chemistry, Vol. XX, No. 6, page 532, for June 1916)..... 2.25
14179. **INNER TUBE** only of No. 14178..... 1.10
14180. **OUTER JACKET** only of No. 14178..... 1.25
- VASCULUM**, see Botanical Apparatus.
- VERNIER CALIPERS**, see Calipers.
- VIALS**, see Bottles.
- VISCOSITY PIPETTE**, see Physical Chemistry Apparatus.
- VISCOSIMETERS**, see Oil Testing Apparatus.
14188. **VICES**, Anvil, adjustable jaws, strongly constructed. Base is drilled to fasten rigidly to bench by screws.
- | No. | A | B | C |
|-------------------------------|----------------|----------------|-------|
| Width of opening, inches..... | 3 | 4 | 5 |
| Width of jaw, inches..... | $2\frac{1}{2}$ | $3\frac{1}{2}$ | 4 |
| Weight, pounds | 9 | 25 | 35 |
| Each | 6.50 | 8.10 | 10.00 |
14190. **VICES**, Anvil with Clamp. Provided also with a steel base drilled to fasten rigidly to bench by screws.
- | No. | A | B |
|-------------------------------|----------------|----------------|
| Width of opening, inches..... | $2\frac{1}{2}$ | $3\frac{1}{2}$ |
| Width of jaw, inches..... | $2\frac{1}{4}$ | $2\frac{3}{4}$ |
| Weight, pounds | $5\frac{1}{2}$ | 9 |
| Each | 3.00 | 4.20 |
14192. **VICES**, Anvil with Clamp, Small. Very convenient for laboratory use.
- | No. | A | B |
|-------------------------------|----------------|----------------|
| Width of opening, inches..... | $1\frac{1}{2}$ | $1\frac{3}{4}$ |
| Width of jaw, inches..... | $1\frac{1}{2}$ | 2 |
| Weight, pounds | $1\frac{1}{2}$ | $2\frac{1}{2}$ |
| Each | 1.20 | 1.80 |



No. 14196.



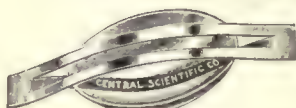
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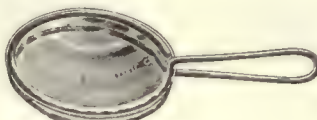
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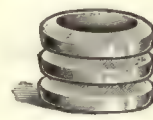
No. 14224.



No. 14228.



No. 14230.



No. 14236.

14196. **WISE, Hand**, with parallel jaws. Very convenient and useful. Made from drop forgings, with the faces of the jaws scored and case hardened. The faces of the jaws are $1\frac{1}{16}$ inches long, $\frac{3}{8}$ inch wide; jaws open $1\frac{3}{8}$ inches; whole tool $4\frac{1}{2}$ inches long. Black finish..... \$2.00

VOLTMETERS, see **Electrical Instruments**.

VOLUME OF LOAF APPARATUS, see **Flour Testing Apparatus**.

WARMING TABLE, see Nos. 8862, 8864, and 8936.

WARM STAGES, see **Microscope Accessories**.

14214. **WASHER CUTTER**. A strong, well made, useful device for cutting washers of diameter from $\frac{1}{2}$ in. to $5\frac{1}{2}$ in. Provided with removable blade adjustable as to length of cutting edge as well as position. These blades can easily be removed for sharpening or replaced when they wear out. Nicely polished and attractive in appearance 2.25

WASHING BOTTLES, see **Bottles**.

WASHING BOTTLES for Gas, see **Gas Washing Bottles**.

WASHING PANS for Gold, see **Pans**.

14220. **WASTE CAN**, Galvanized, $14 \times 14\frac{1}{4}$ inches; capacity, $9\frac{1}{4}$ gallons; with seamless cover fitting over outside 3.00

WASTE JARS, see **Jars**.

WASTE PAIL, see **Pails**.

14224. **WATCH GLASSES**, well annealed, with edges smoothly ground.

Diameter, inches...	1½	2	2½	3	3½	4	4½	5	6	7	8
Per dozen.....	.40	.50	.60	.70	.90	1.00	1.20	1.30	1.60	1.80	2.00

14226. **WATCH GLASSES**, in Pairs, with edges ground to fit accurately together, for use with Clamps Nos. 2902-4.

Diameter, inches	2	2½
Per pair .....	.20	.25

14228. **WATCH GLASSES**, in Pairs, same as No. 14226, with Clamp No. 2902.

Diameter, inches	2	2½
Per pair with clamp .....	.32	.37

14230. **WATCH GLASSES**, in Pairs, same as No. 14226, with Clamp No. 2904.

Diameter, inches	2	2½
Per pair with clamp .....	.30	.35

WATCH GLASS CLAMPS, see **Clamps**.

824. **WATCH GLASSES**, Counterpoised, for use on balance pans.

Diameter, mm.....	50	62	75
Per pair .....	.90	1.00	1.25

WATCH GLASSES, Embryological, see **Dishes**, **Staining**.

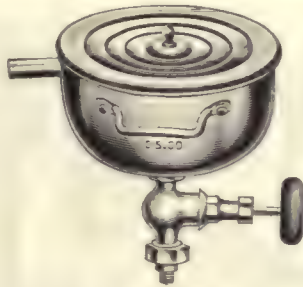
14236. **WATCH GLASSES**, Syracuse, plain; outside diameter 65 mm; inside diameter, 50 mm. Grooved to facilitate stacking.....Per dozen .70

14238. **WATCH GLASSES**, Syracuse, same as No. 14236, with beveled surface ground for writing.Per dozen 1.00

14244. **WATCH SPRINGS**, for burning in oxygen.....Per dozen .20



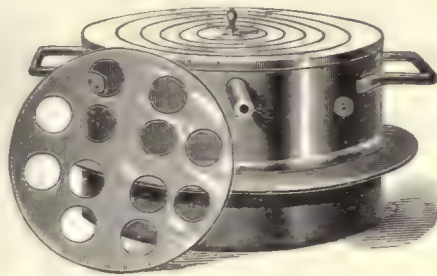
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No. 14252.



No. 14254.



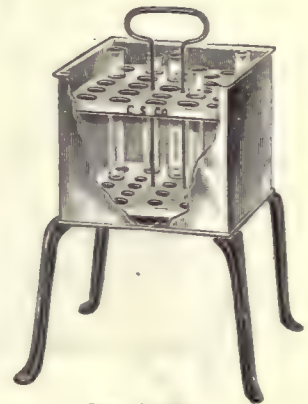
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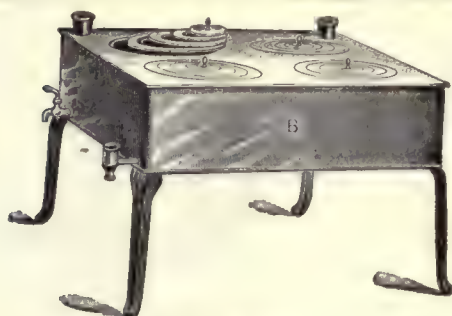
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No. 14268.

WATER BATHS

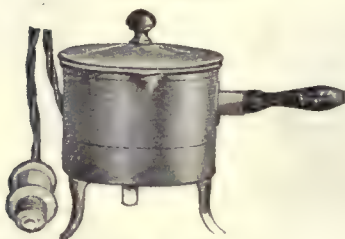
14250. WATER BATHS, polished copper, tin lined, with concentric copper rings and cover, handles and steam escape.					
Diameter, inches	4	5	6	8	10
Number of rings	3	4	5	6	8
Each	\$1.30	1.45	2.00	3.20	5.00
14252. WATER BATHS, for Steam Heat, same as No. 14250 with steam valve and waste pipe.					
Diameter, inches			6	8	10
Each			5.40	6.60	9.10
14254. WATER BATHS, polished copper, same as No. 14250, with constant water level.					
Diameter, inches	4	5	6	8	10
Number of rings	3	4	5	6	8
Each	1.80	2.00	2.25	2.70	5.00
14258. WATER BATH, polished copper, with 5 concentric rings and water level regulator. Diameter, 6 inches; depth, 4 inches. Complete with iron tripod 9 inches high.....					6.00
14262. WATER BATHS, seamless polished copper, tin lined, with copper concentric rings and cover, steam escape, handles, flange for tripod, and perforated plate for test tubes up to 5/8 inch in diameter.					
Diameter, inches				6	8
With plate for, tubes.....				12	19
Each				4.50	6.50
14264. WATER BATHS, same as No. 14262, with tripod and copper rack for test tubes up to 5/8 inch in diameter.					
Diameter, inches				6	8
For test tubes.....				12	19
Each				5.00	7.00
14266. WATER BATH, for dissolving steel samples, of polished copper, tin lined, with zinc tray for 18 test tubes 6 x 5/8 inch. Diameter, 6 inches; height, 7 inches.....					5.00
14268. WATER BATH, for dissolving steel samples, square form, 7 1/2 x 7 1/2 x 6 1/2 inches high, of polished copper, tin lined, with tray for 25 test tubes 8 x 7/8 inch. Mounted on heavy iron support					7.50



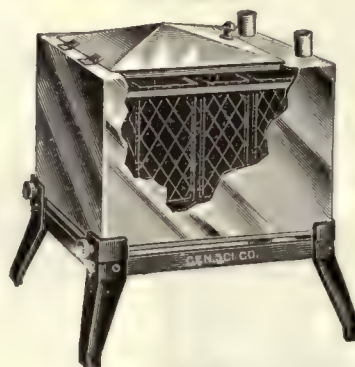
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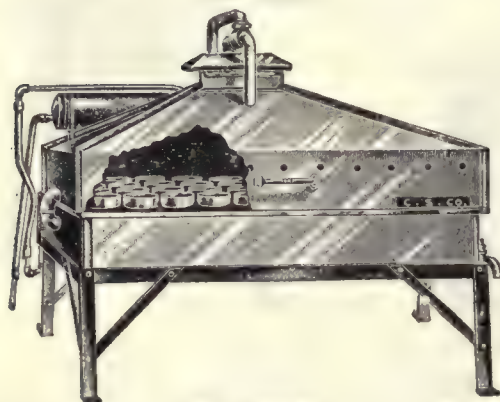
No. 14276.



No. 14282.



No. 14288.



Nos. 14290-1.



No. 14292.

14272. **WATER BATH**, rectangular form, with 4 openings 5 inches in diameter, with concentric rings, and cover, stop-cock for draining, constant water level regulator, tubulatures for thermometer and thermo-regulator, and an extra sheet iron bottom, mounted on heavy iron support. Dimensions, 14 inches square by 5 inches deep..... \$21.00
14274. **WATER BATH**, same as No. 14272, but with coil for steam heat..... 25.00
14276. **WATER BATH**, of similar construction to No. 14272, but with 7 openings, 3 of 6 inches diameter, and 4 of 4 inches. Dimensions, 23 x 13½ x 5 inches deep..... 27.50
14278. **WATER BATH**, same as No. 14276, but with coil for steam heat..... 31.50
14282. **WATER BATH, Electrically Heated**, with cup of seamless copper nickel-plated and concentric rings. Provided with self-enclosed heater, and with automatic cut-out, which shuts off the current if the vessel boils dry. It will boil 1 quart of water in 6 minutes. Diameter, 4 inches; capacity, 1 quart; power consumption, 550 watts. Complete with 6 feet of silk covered cord and attachment plug for connection to any 110 volt lamp socket..... 22.00
14288. **WATER BATH, Agar Melting**, gas heated, for keeping agar liquefied for inoculation previous to pouring into Petri dishes. Made of heavy copper tinned inside, with lid which slopes from the center to all four sides preventing moisture from dripping into the tubes. Troughs are arranged along the sides to carry off the condensed moisture. Provided with tubulations for thermometer and thermo-regulator. Complete with six tinned wire test tube baskets, 3¼ x 3¼ x 6 inches, and with cast iron support stand 8¼ inches high. Height over all, 18 inches; length, 11½ inches; width, 7¾ inches. Without burner 35.00
14290. **WATER BATH, Alsop's**, as used in tanning and leather laboratories. Of heavy copper with condenser at top which may be used to furnish distilled water. Length inside, 25 inches; width inside, 20 inches; capacity, 60 crystallizing dishes 80 mm in diameter. For gas heat.. 200.00
14291. **WATER BATH, Alsop's**, same as No. 14290, but with coil for heating by steam..... 215.00
14292. **WATER BATH, Blair's**, with rack for 10 test tubes; as used in iron analysis. Of polished copper, 7 inches in diameter..... 4.75



No. 14296.

14296. WATER BATH, DeKhotinsky, Electrically Heated, intended to replace the ordinary Bunsen burner heated bath, in laboratories where electric current is available. The bath consists of a copper container $\frac{1}{2}$ mm (0.02 inch) thick, spun in one piece and nickel-plated. It is lagged with 25 mm (1 inch) of magnesia-asbestos and protected outside by red fiber. The bath is attached to an enameled cast-iron base, fitted with a nickel-plated supporting rod, to which laboratory clamps may be attached for the support of flasks, condensers, etc. The top of the bath is fitted with a set of six porcelain rings to accommodate the different sizes of flasks or evaporating dishes.

Capacity of bath.....	1000 cc.	Height (without stand).....	12.5 cm.
Volume of container.....	1400 cc.	Height (inside).....	9.5 cm.
Diameter (outside).....	19 cm.	Height (with stand).....	18.5 cm.
Diameter (inside)	14 cm.	Weight	10 lbs.

Four electric heating units of 44 watts each are used to supply heat to the bath. These units may be added one by one, by means of the switch which constitutes a part of the bath, and the desired temperature thus secured. The bath has a constant water level attachment, by means of which the water level may be kept constant at any point within a range of 25 mm (1 inch). The regularity of the water level is 1 mm.

The following table shows the capacity of the bath:

Number of heating units.....	3	2	1
Total energy consumed, watts.....	132	88	44
Temperature maintained, C.....	100°	95°	72°

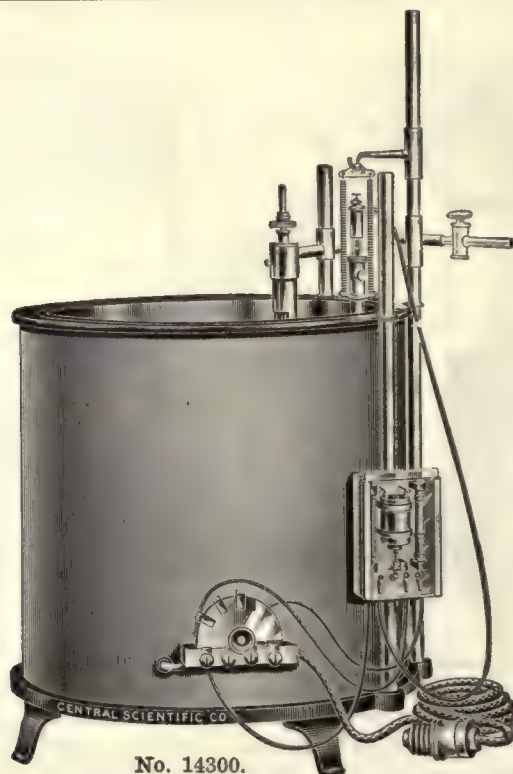
With four heating units (176 watts) the boiling is, of course, more rapid.

As the heating units are inserted in brass tubes placed permanently inside of the bath, 20 mm from the bottom, their heating value comes to 99 per cent. of the theoretical expenditure of energy. Placed as they are, the heating units are absolutely protected from accidental injury. To replace these units takes no more time or skill than to replace an incandescent lamp in its socket. This bath operates on either a direct or alternating current, and may be attached to any Edison socket. Complete as described, without glassware.

No.	A	B
For volts	110	220
Each	\$27.50	30.00

HEATING UNITS, extra, for No. 14296, 44 watts each.

No.	7526A	7527A
For volts	110	220
Each	1.00	1.25



No. 14300.

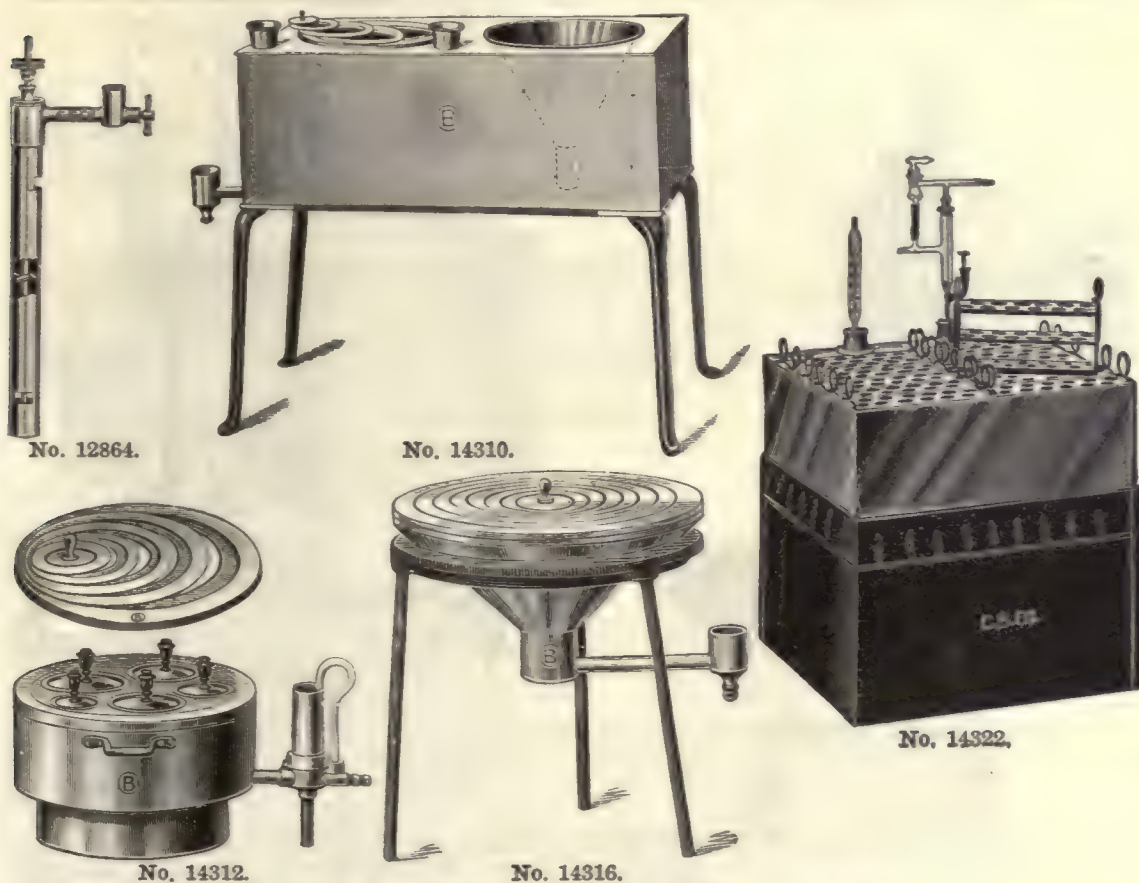
WATER BATH, DeKhotinsky, Electrically Heated and Regulated (Patented), intended for use in modern chemical, physical and bacteriological laboratories, where constant temperature is imperative. It consists of a copper container $\frac{3}{4}$ mm ($\frac{1}{32}$ inch) in thickness, heavily nickel-plated inside and out, lagged with 25 mm (1 inch) magnesia-asbestos (magnesia 85%), and protected outside by a sheet of Russia iron. The bath is attached to an enameled cast-iron base, supplied with three nickel-plated rods, to which may be attached laboratory clamps for supporting flasks, etc. Each bath is fitted with four electric heating units, three of which may conveniently be added one by one, by means of the switch constituting part of the bath. The fourth unit is electrically connected to the relay, which is automatically operated by a thermo-regulator.

The thermo-regulator consists of a solid drawn-steel tube, brass covered, nickel-plated, filled with mercury, with a platinum contact attached to a regulating cap, by means of which the bath can be regulated and set to the desired temperature, ranging from the temperature of the surrounding atmosphere to the boiling point of water. Should a temperature higher than the boiling point be needed, the water may be replaced by Criseo, which can be used up to a temperature of 165° C., or even higher. For temperatures within 2 degrees of room temperature and lower, No. 14306 Cooling Coil must be used. With this bath, when provided with a No. 12864 High Speed Turbine Stirrer, the temperature can be held constant to $\frac{1}{10}$ degree C., over long periods of time.

A constant water level attachment is furnished with each bath, by means of which the water level can be regulated within a range of 35 mm ($1\frac{1}{2}$ inch) and maintained within 1 mm of the level at which it is set. This bath has a very good natural circulation, as heat is supplied inside the bath 25 mm from the bottom. When experiments or research demand a more vigorous circulation and regulation closer than $\frac{1}{10}^{\circ}$ C., a small High Speed Turbine Stirrer No. 12864 can be attached to the bath. This stirrer of 18 mm diameter takes water from the bottom of the bath at the rate of five liters per minute, and delivers it at the top with an energy expenditure in the motor of 15 watts. On the shaft of the circulation turbine is an extra pulley to connect with the glass stirrer in the flask. Complete with water bath, four heating units, relay, thermo-regulator, constant water-level device, support rods, five feet of cord and attachment plug. If uniformity of temperature throughout bath is desired, stirrer should be included.

No.	A	B
Capacity, liters	9.3	18.25
Diameter inside, cm.	25	30.5
Available height inside, cm.	19	25
14300. For 110 volts A. C.	\$75.00	98.50
14301. For 220 volts A. C.	77.50	101.00
14302. For 110 volts D. C.	72.50	96.00
14303. For 220 volts D. C.	75.00	98.50

Note:—In ordering state mean temperature desired, so that heating units of correct wattage may be furnished.



14306. **COOLING COIL**, for use in Water Baths No. 14300, of copper nickel-plated.

No.	A	B
For Bath No.	A	B
Each	\$8.00	10.00

HEATING UNITS, extra, for No. 14300, see Nos. 7526-7.

12864. **STIRRERS**, High Speed Turbine, for use with Nos. 14300-3.

No.	A	C
For Nos. 14300-3.	A	B
Diameter, mm.	22	30
Capacity, liters per minute.	5	E
Power required to operate, h. p.	$\frac{1}{16}$	$\frac{1}{12}$
Each	6.00	7.00

14310. **WATER BATH**, Griffin's, for hot filtration and evaporation. Of heavy copper, tin lined, with two 5 inch openings in the top. One opening is fitted with a copper funnel, the other is provided with four concentric copper rings. Complete with constant water level regulator and tubulatures for thermometer and thermo-regulator, mounted on support with extra sheet iron bottom and detachable legs. Dimensions, 13 x 7 x 5 inches high. 13.00

14312. **WATER BATH**, Hofmann, of polished copper, tin lined, with a set of concentric rings and a plate with five different sized openings, each with cover. Diameter at top, 8 inches; depth, 5 inches; with constant water level and handles. 15.50

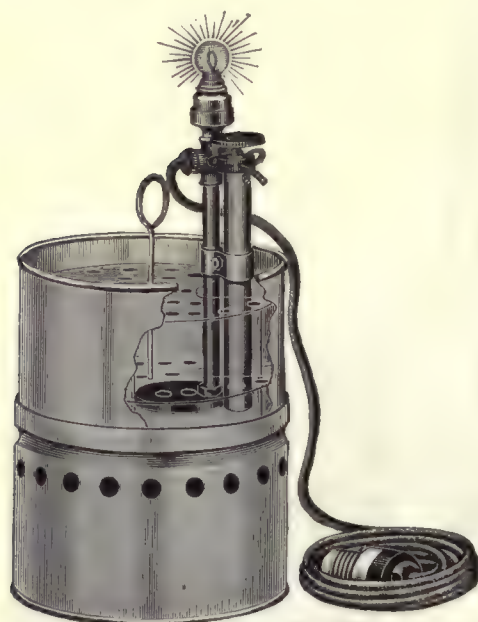
14316. **WATER BATH**, Victor Meyer's, funnel shape, of polished copper, tin lined, with concentric rings, cover and constant water level, with tripod 8 inches high. Diameter, 6 inches. 5.50

14322. **WATER BATH**, Wassermann, with 12 copper racks, each of which holds 12 tubes 4 x $\frac{1}{2}$ inches. These racks are so arranged that they can be lifted out of the bath by the two handles attached to each of the racks, and are also supplied with a center division to allow shaking of the test tubes without danger of dropping. The bath is made of heavy polished copper, with a perforated bottom, thereby providing for a large volume of water. Complete with thermometer, glass thermo-regulator for controlling the temperature, and 12 copper racks. Height over all, 13 $\frac{1}{2}$ inches; length, 12 $\frac{1}{2}$ inches; width, 12 $\frac{1}{2}$ inches; depth, 5 $\frac{1}{2}$ inches. With sheet iron base 8 inches high. Without burner. 35.00

14323. **SUPPORTS**, Test Tube, only for No. 14322, for tubes 4 x $\frac{1}{2}$ inches.

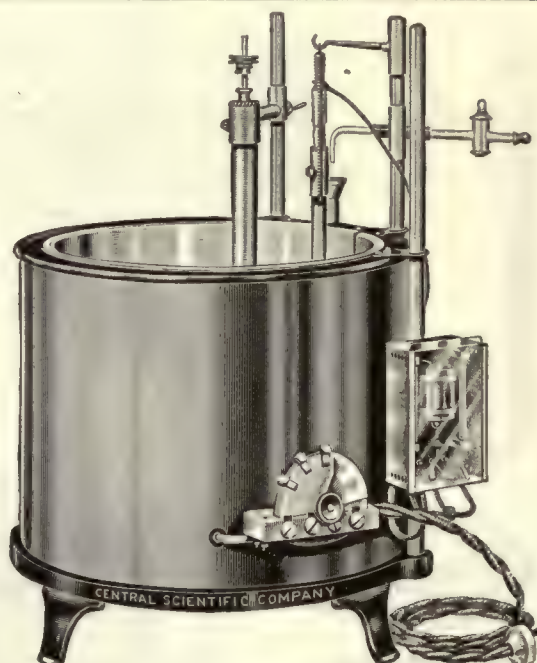
No.	A	B	C
For tubes	12	24	40
Each	1.30	2.00	2.60

TEST TUBES, Wassermann, see No. 13390.



Nos. 14326-8.

PAT. APPL. FOR



No. 14332.

14326. WATER BATH, Wassermann, round form, of copper tin lined, with copper rack for holding 28 test tubes 3 x $\frac{3}{8}$ inches, and with tubulatures for thermometer and thermo-regulator, mounted on sheet iron base, 4 inches high. Diameter, 6 inches; depth, 4 inches. Without heater or thermo-regulator \$12.00

14328. ELECTRIC HEATER AND THERMOSTAT, Combined, for No. 14326. Consisting of a heating disk 5 inches in diameter by $\frac{1}{2}$ inch in thickness, mounted with an adjustable pencil-type electro-thermostat 6 inches long and $\frac{5}{8}$ inch in diameter, with a pilot lamp to indicate when the current is on or off. This outfit can be used for heating and regulation in any water bath whose capacity does not exceed 2 quarts with the depth of the water not less than 2 inches. It can be set for any temperature between 35° and 60° C., but the best results are obtained by having it set at the factory for a fixed temperature and not readjusting it. Shipping weight, 3 pounds. Complete with 6 feet of flexible cord and an attachment plug for connection to any 110 volt lamp socket. Without water bath. 25.00

14332. WATER BATH, Wassermann, DeKhotinsky Electrically Heated and Regulated, for precision work in incubation, inactivation, the study of thermal death-points, etc. This bath is a special type of the DeKhotinsky Electrically Heated and Regulated Water Baths No. 14300, of a shape and design adapted especially for bacteriological and clinical work. It will accommodate special supports for 48 Wassermann tubes, and trays for 18 Vaccine tubes. It is of the same construction as No. 14300, and is provided with the same system of heating and regulation, for control of temperature to 1/10° C. In order to secure this degree of precision, Stirrer No. 12864A must be included in the equipment. Diameter of the bath, 10 inches; available height, 8 inches. Complete with four standard heating units, mercury thermo-regulator, sensitive iron-clad relay, constant water level device, three-point switch, three support rods for clamping devices in the bath, and five feet of cord and attachment plug, but without stirrer, test tube supports, or cooling coil.

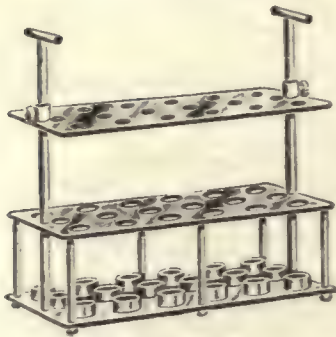
No.	A	B	C	D
	A. C.			
For volts	110	220	110	220
Each	75.00	77.50	72.50	75.00

14333. COOLING COIL, for use with No. 14332 when it is necessary to maintain the temperature within 2 degrees of room temperature or lower. 8.00

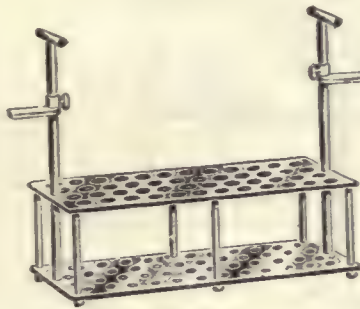
HEATING UNITS, extra, for No. 14332, 115 watts each.

No.	7526D	7527D
For volts	110	220
Each	1.00	1.25

12864A. STIRRER, High Speed Turbine, for use with No. 14332 in order to hold the temperature constant to 1/10 degree C. It clamps on one of the support rods, and has two pulleys at the top, one for belting to a motor, the other for operating a stirring rod in flasks or other vessels in the bath. Capacity, 5 liters per minute; power required to operate, $\frac{1}{16}$ h. p. 6.00



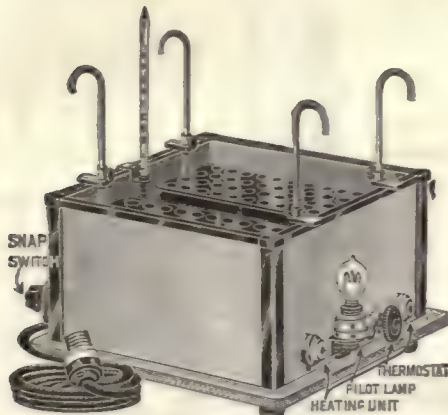
No. 13172.



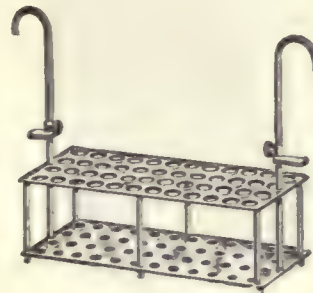
No. 13174.



No. 14340.



No. 14336.



No. 14337.

13172. **SUPPORT** for use with No. 14332, for 18 Vaccine tubes \$5.00

13174. **SUPPORT** for use with No. 14332, for 48 Wassermann tubes 4.50

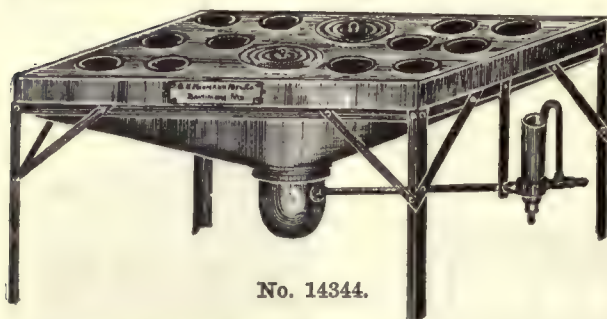
14336. **WATER BATH, Wasserman, Schultz, Electrically Heated and Regulated**, for routine work not requiring such close regulation as is obtained with No. 14332. The bath is made of heavy copper, tinned on the inside, and covered on the outside with thick insulating material. The heating units are wound on lavite cores, and are placed in metal tubes at the bottom of the bath, these tubes being entirely surrounded by water. Provisions are made, so that the units can be easily replaced in case of accidental injury. A snap switch is provided, which controls one-half of the heating units, the others being permanently connected in the circuit. The bath may be used at a temperature of 56° C. as an inactivating bath, or at 37.5° C. for incubation purposes. Regulation of the temperature is effected by a removable Pencil Type Bimetallic Thermostat, placed in a metal tube at the bottom of the bath near the heating units. A pilot lamp is furnished for indicating when the current is on or off. For 110 volts A. C. or D. C. Complete with test tube racks, thermometer, 3x $\frac{3}{8}$ inch test tubes, and 7 feet of connecting cord and attachment plug.

No.	A	B
Dimensions, inches	9x4 $\frac{1}{2}$ x5	9x9x5
Number of racks.....	1	2
Capacity, tubes	48	96
Current consumption, amperes.....	1 $\frac{1}{2}$	2
Each	42.50	55.00

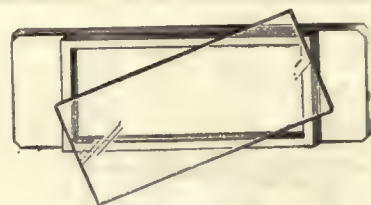
In ordering, kindly specify whether the thermostat should be set for 37.5° or 56° C.

14337. **TEST TUBE RACK** only of No. 14336, holding 48 3x $\frac{3}{8}$ inch test tubes. Made from nickel-plated brass with adjustable supports for suspension in bath, and furnished with three shelves as shown in illustration. Dimensions of rack: 8 $\frac{7}{8}$ x3 $\frac{7}{8}$ x2 $\frac{1}{2}$ inches high. Height over all, 8 inches. Without test tubes..... 5.50

14340. **WATER BATH, Whipple's**, for melting gelatine. Of heavy copper, tinned inside, with rack to hold 48 test tubes up to $\frac{3}{4}$ inch in diameter. An incandescent lamp may be used to heat the bath to the required temperature. Diameter of bath, 12 inches; depth, 5 inches. Without lamp, lamp socket or cord..... 17.50



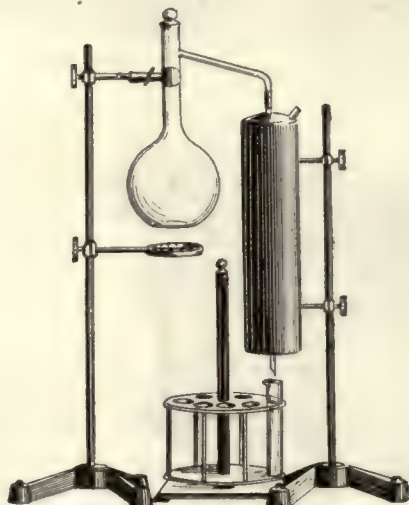
No. 14344.



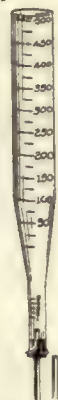
Nos. 14357-8.



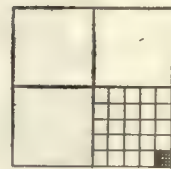
No. 14366.



No. 14370.



No. 14352.



No. 14359.

14344. **WATER BATH, Wiley Patented**, designed to generate steam quickly with small gas consumption. Of heavy copper with replaceable water cup of spun copper 3 $\frac{3}{8}$ inches in diameter, with 12 openings 3 $\frac{1}{2}$ inches and 2 openings 5 $\frac{1}{4}$ inches in diameter, with concentric copper rings and constant water level regulator, mounted on substantial angle iron support. Dimensions of top, 25 x 14 $\frac{1}{2}$ inches; depth on outside edge, 2 inches; depth in center, 4 inches; capacity to water inlet, 250 cc. Can be operated easily by one ordinary Bunsen burner..... \$50.00
14345. **EXTRA WATER CUPS** for No. 14344.....each 1.15

WATER EXAMINATION APPARATUS

COLOR TUBES, see Nos. 3014 to 3032.

3010. **HEHNER'S CYLINDERS** for the estimation of iron in water, consisting of two graduated glass tubes of same size and graduation, with stop-cocksper pair 6.00

HYDROTIMETERS for hardness of water, see No. 7800.

NESSLER JARS, see *Color Comparison Tubes*.

SEDGWICK-RAFTER APPARATUS, for Microscopical Examination of Water. See "The Microscopy of Drinking Water," by Geo. C. Whipple.

14352. **SEDGWICK-RAFTER FUNNEL**, graduated, with attachment and rubber stopper..... 3.25
14353. **SEDGWICK-RAFTER FUNNEL**, plain, with attachment and rubber stopper..... 1.50
14354. **BERKSHIRE SAND**per pound .15
14355. **BOLTING CLOTH DISKS**.....per dozen .25
14356. **SUPPORT** for funnel 1.75
14357. **COUNTING CELL** 3.50
14358. **COVER SLIP**30
14359. **EYEPIECE MICROMETER** 3.50
14360. **PIPETTES**, a set of two, one each 1 cc and 5 cc.....per set .35
14361. **GRADUATED FLASK**, 25 cc..... .50

MICROSCOPE, see general heading *Microscopes*.

WATER HEATERS, see *Heaters*.

14366. **WATER SAMPLE CASE**, consisting of a well made wooden case with hinges, hasp and handle; with separate compartments for one 5 pint and one 4 ounce glass stoppered bottle. Excellent for obtaining samples of drinking water for analysis by health departments. Complete with bottles and container for small bottle..... 5.00
- 14370 **WATER TESTING APPARATUS**, for the determination of ammonia in water, as used by the Department of Health of New York City, consisting of a metal condenser with block tin condenser tube and support, eight Nessler cylinders graduated at 50 and 100 cc in revolving support, flask, burner and support for same..... 25.00

14376.	WAX, Bees', Genuine, unbleached, in cakes.....	Per lb. \$1.00
14377.	WAX, Bees', Imitation (ceresin), yellow.....	Per lb. .40
14378.	WAX, Sealing, express, red, four sticks to the pound.....	Per lb. .55
14380.	WAX, Universal, for use in the laboratory wherever a plastic yet firmly adhesive cement is needed. In 4-ounce jars.....	Per jar .30
14382.	WAX TAPERS, for burning in oxygen, etc., in boxes of 12.....	Per box .10
14390.	WEATHER FORECAST CHART, or Key to Barometer Reading, and Chart for Aneroid Barometer, by J. Benj. F. Rawson, late of the Weather Bureau. This chart is intended as an aid in the intelligent interpretation of barometer readings and in forecasting weather for twenty-four hours. This chart will be found quite accurate and most useful in any science laboratory. With full directions.....	.50
14392.	"WEATHER AND WEATHER INSTRUMENTS." This book describes the mechanism of the many instruments and in addition gives in concrete and simplified form the practical uses of the different instruments. The tables of classified data recommend it particularly to teachers. Pasteboard covers .....	.50
14393.	"WEATHER AND WEATHER INSTRUMENTS," same as above, cloth covers.....	1.10
14396.	"PRACTICAL HINTS for Amateur Weather Forecasters." Information on the care and exposure of barometers. 24 pages, illustrated .....	.10
	WEIGHING BOTTLES, see Bottles.	

WIRE, ALL KINDS

14410.	WIRE, Aluminum, bare.																	
	B. & S. No.....	14	16	18	20	22	24	26	27	28	30							
	Approx. diameter, inches..	.064	.051	.040	.032	.025	.020	.016	.014	.013	.010							
	Per 4 oz. spool.....	....	....	....	....	....	1.50	1.80	2.10	2.40	3.75				
	Per 1 lb spool.....	2.45	2.70	2.85	3.30	3.90	5.10	....	....	....	....			
14412.	WIRE, Brass Spring, on 4-ounce spools.																	
	Washburn & Moen No..	16	18	20	22	24	26	27	28	30	32	34	36					
	Approx. diam., inches..	.063	.047	.035	.028	.023	.018	.017	.016	.014	.013	.010	.009					
	Approx. feet per spool.	20	33	68	108	170	270	340	430	550	862	2270	3520					
	Per spool .....	.40	.40	.40	.45	.55	.60	.66	.66	.70	.80	1.10	1.80				
14416.	WIRE, Copper, Annunciator Wire, double cotton covered and paraffined. Orders not accepted for less than 1 lb.																	
	B. & S. No.....					16		18		20		22	24					
	Approx. feet per pound.....					106		157		230		350	550					
	Per pound					1.45		1.50		1.55		1.65	1.70					
14418.	WIRE, Copper, Lamp Cord, composed of fine wires insulated with rubber and braided cotton; two conductors twisted.																	
	B. & S. No.....							16		18		20	22					
	Per foot.....							.10		.05		.05	.05					
	WIRE, Copper, Magnet Wire.																	
	B. & S. No...	10	12	14	16	18	20	22	24	26	27	28	30	32	34	36	40	
	Approx. diam., inches102	.081	.064	.051	.040	.032	.025	.020	.016	.014	.013	.010	.008	.006	.005	.003	
14422.	BARE WIRE.																	
	Per 4 oz. spool65	.65	.65	.65	.65	.70	.75	1.00		
	Per 8 oz. spool95	.95	1.00	1.00	1.05	1.10	1.20		
	Per 1 lb. spool.	1.40	1.40	1.40	1.45	1.45	1.45	1.50	1.55	1.55	1.60	1.60	1.65	1.70	1.80	1.90	
14423.	D. C. C. WIRE.																	
	Per 4 oz. spool75	.80	.90	.95	1.05	1.10	1.15	1.30	1.50	1.70	2.00	4.35	
	Per 8 oz. spool	1.20	1.25	1.45	1.65	1.80	1.90	1.95	2.30	2.65	3.05	3.65	
	Per 1 lb. spool.	1.60	1.65	1.70	1.80	1.90	2.15	2.45	2.70	3.00	3.25	3.40	3.90	4.60	5.50	6.70	
14424.	D. S. C. WIRE.																	
	Per 4 oz. spool95	1.05	1.25	1.40	1.50	1.60	1.95	2.45	3.25	3.95	7.90		
	Per 8 oz. spool	1.40	1.60	1.80	2.15	2.45	2.70	2.90	3.60	4.55	6.25	7.55	
	Per 1 lb. spool	2.30	2.45	2.80	3.20	3.75	4.40	4.85	5.25	6.55	8.45	11.85	14.45
14428.	WIRE, Copper, Magnet Wire, Enameled. The enamel insulation is an elastic yet resistant and firmly adhering film. This insulation is exceedingly inert toward the ordinary agencies met in practice, which cause silk or cotton insulation to rapidly deteriorate and lose their value as insulating mediums. Impervious to moisture. Requires less winding space. Positive dielectric strength. More feet to the pound.																	
	B. & S. No.....							26		28		30		36		40		
	Feet per oz.....							80		128		200		800		2000		
	Per 4 oz. spool.....							.75		.75		.80		1.05		1.75		
	Per lb. spool.....							1.85		1.95		2.00		2.90		5.45		
14430.	WIRE, Copper, Rubber Covered.																	
	B. & S. No.....											12		14		16		
	Per foot06		.05		.05		
14432.	WIRE, Copper, Soft, bare, on 4-ounce spools.																	
	Washburn & Moen No..	16	18	20	22	24	26	27	28	30	32	34	36					
	Approx. diam., inches..	.063	.047	.035	.028	.023	.018	.017	.016	.014	.013	.010	.009					
	Feet per spool.....	20	32	66	102	160	260	325	410	510	810	2050	3175					
	Per spool40	.40	.40	.45	.55	.60	.66	.66	.70	.80	1.10	1.80					

For **WIRE TABLES**, see pages 527-8.

14434. WIRE, Copper, Stage Cable. Consists of two flexible conductors, insulated according to Underwriters' specifications, the whole being covered with a black cotton braid, thus forming a substantial single cable. Suitable for use with Arc Projecting Lanterns, Motors, etc.													
B. & S. No.....	10	12	14										
Capacity, amperes.....	32	23	16										
Per foot	\$0.25	.20	.15										
14438. WIRE, FUSE.													
Amperes	1/2	1	2	3	5	6	10	12	15	40			
Size of spools 4 oz.	8 oz.	8 oz.	8 oz.	1 lb.	1 lb.	1 lb.	1 lb.	1 lb.	1 lb.	1 lb.			
Feet per spool	400	500	340	220	168	145	82	66	53	17			
Per spool	1.35	1.10	1.00	1.00	1.95	1.70	1.55	1.55	1.50	1.50			
WIRE, German Silver, 18% alloy.													
B. & S. No.....	16	18	20	22	24	26	27	28	30	32	34	36	
Approx. diam., in...	.051	.040	.032	.025	.020	.016	.014	.013	.010	.008	.006	.005	
14440. BARE WIRE.													
Per 4 oz. spool.....	....	....	.85	.95	1.00	1.05	1.05	1.05	1.15	1.25	1.30	1.55	
Per 8 oz. spool.....	....	1.40	1.45	1.55	1.70	1.70	1.80	1.80	1.95	2.15	2.35	2.75	
Per 1 lb. spool.....	2.35	2.35	2.50	2.70	2.85	2.95	3.00	3.10	3.25	3.65	4.05	4.85	
14441. D. C. C. WIRE.													
Per 4 oz. spool.....	....	....	1.05	1.15	1.25	1.35	1.40	1.45	1.70	1.95	2.25	2.95	
Per 8 oz. spool.....	....	1.60	1.80	2.00	2.20	2.40	2.55	2.65	3.05	3.60	4.25	5.60	
Per 1 lb. spool.....	2.70	2.85	3.15	3.55	3.90	4.25	4.55	4.75	5.45	6.50	7.80	10.50	
14442. D. S. C. WIRE.													
Per 4 oz. spool.....	....	....	....	....	1.80	2.00	2.20	2.30	2.80	3.50	4.60	5.60	
Per 8 oz. spool.....	....	....	....	2.75	3.30	3.70	4.05	4.35	5.30	6.70	8.95	10.95	
Per 1 lb. spool.....	....	....	4.30	5.15	6.00	6.90	7.55	8.15	9.90	12.70	17.20	21.20	
WIRE, Iron, see No. 14488 Steel Wire.													
14450. WIRE, Iron, Chemically Pure, for standardizing, containing 99.85 per cent. Fe. In glass containers.													
Size, ounces	1	4	8										
Each .....	.30	.60	1.00										
14454. WIRE, Lead, diameter 1/8 inch.....Per foot													
14464. WIRE, Nickel, pure, bare.													
B. & S. No.....	16	24	28										
Per oz. ....	.25	.30	.35										
14466. WIRE, Nickel-Copper Alloy, Ideal, bare, soft annealed, used in the manufacture of electrical instruments where extreme low temperature coefficient, accuracy and permanency are desired. Resistance is 29 times that of copper and temperature coefficient for 1° C. = +0.000005.													
B. & S. No.....	18	20	22										
Per lb.	4.05	4.35	4.65										
14468. WIRE, Nickel-Copper Alloy, Ideal, same alloy as No. 14466. Nos. 18 and 20 are double cotton covered. The remaining numbers are double silk covered.													
B. & S. No....	18	20	22	24	26	28	30	32	36	38			
Per oz. ....	.80	.85	.90	.95	1.15	1.40	1.50	1.90	2.80	5.50			
Per lb.	6.00	6.75	7.05	7.50	9.00	10.05	12.00	....	....	....
14472. WIRE, Nickel-Steel-Chromium Alloy, Phenix, bare, used extensively in the manufacture of lantern rheostats, etc., where a high specific resistance combined with ability to withstand oxidation and corrosion is desired. Resistance is 50 times that of copper; temperature coefficient for 1° C. = +0.00054.													
B. & S. No.....	12	16	20										
Per lb.	3.45	3.60	3.75										
14476. WIRE, Piano, on spools.													
Music gage No.....	00	0	1	2	3	4	5	6	7	8			
Approx. diameter, inches..	.0087	.009	.010	.011	.012	.013	.014	.015	.018	.019			
Approx. feet on spool....	15	15	14	12	12	12	10	10	8	8			
Per spool	—	—	—	—	—	—	—	—	—	—			
14478. WIRE, Piano, steel, in 1/4 pound rolls.													
Music gage No.....	1	2	4	5	6	7	8	9					
Approx. diameter, inches.....	.010	.011	.013	.014	.015	.018	.019	.022					
Per roll.....	4.35	2.70	1.80	1.50	1.35	1.15	1.05	.90					
Music gage No.....	10	12	14	18	23	26							
Approx. diameter, inches.....	.025	.028	.032	.040	.049	.061							
Per roll.....	.70	.65	.60	.55	.50	.50							
14480. WIRE, Picture, steel, in packages of 25 yards. No.....													
Per package	0	1	2										
Per package .....	.15	.25	.30										
14484. WIRE, Platinoid, bare; temperature coefficient .000286.													
B. & S. No.....	20	24	28	30									
Per oz. ....	.60	.65	.75	.80									
WIRE, Platinum, see general heading Platinum Ware.													
14488. WIRE, Steel, annealed, soft, on 4-ounce spools.													
Washburn & Moen													
No.	16	18	20	22	24	26	27	28	30	32	34	36	
Approx. diam., in..	.063	.047	.035	.028	.023	.018	.017	.016	.014	.013	.010	.009	
Per spool .....	.13	.14	.15	.16	.17	.18	.19	.20	.21	.22	.24	.30	
For WIRE TABLES see pages 527-8.													

For WIRE TABLES see pages 527-8.



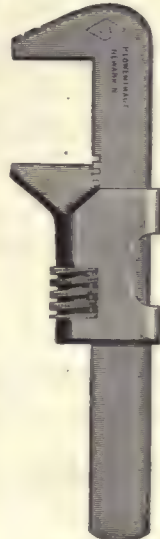
No. 14534.



No. 14522.



No. 14544.



No. 14546.



No. 14548.

14492.	WIRE, Tinsel, not insulated.....	Per yard	\$0.15
14494.	WIRE, Tinsel, Conducting Cord. One conductor. Tinsel wire covered with green braid. Very flexible	Per yard	.10
14496.	WIRE, Tinsel, Conducting Cord. Two conductors, each covered with braid of distinctive colors; the whole covered with another braid. Very flexible.....	Per yard	.30
14504.	WIRE, Zinc, diameter $\frac{1}{8}$ inch.....	Per foot	.15
For WIRE TABLES see pages 527-8.			
WIRE GAGES, see Gages.			
14510.	WIRE GAUZE, Brass, Mesh.....	10 20 40 60 80 100 200	
	Per square foot.....	.70 .75 .80 .90 1.10 1.60 	
14512.	WIRE GAUZE, Brass, 20 mesh, in squares for use under dishes, beakers, etc.		
	No.	A B C F	
	Size, inches	4x4 5x5 6x6 12x12	
	Each .....	.10 .14 .20 .70	
	Per dozen	1.00 1.40 2.00 7.00	
14516.	WIRE GAUZE, Copper, for combustions. Mesh.....	20 40 60 80 100	
	Per square foot.....	.70 .80 .95 1.10 2.05	
14520.	WIRE GAUZE, Iron, 20 mesh, in squares for use under dishes, beakers, etc.		
	No.	A B C F	
	Size, inches.....	4x4 5x5 6x6 12x12	
	Each .....	.04 .05 .08 .30	
	Per dozen .....	.40 .50 .80 3.00	
14522.	WIRE GAUZE, Tinned Iron, with flat asbestos center $3\frac{1}{2}$ inches in diameter, in squares for use under dishes, beakers, etc. No.....	A B C	
	Size, inches	4x4 5x5 6x6	
	Each .....	.10 .12 .15	
	Per dozen	1.00 1.20 1.50	
14526.	WIRE GAUZE, Nichrome, 16 mesh, will last almost indefinitely as the wire is practically rust-proof, and has an extremely high melting point, about 1500° C. (2800°F.).		
	Size, inches	4x4 5x5 6x6 12x12	
	Each .....	.70 .90 1.30 4.00	
14528.	WIRE GAUZE, Nickel, 30 mesh.....	per square foot	—
14534.	WORK BENCH. This bench is 50 inches long, exclusive of tail vise, or 56 inches over all. It is 32 inches high and 20 inches wide, with a 13 inch glued up maple top $1\frac{3}{4}$ inches thick and a 7 inch well for tools. It has holes for stops, and three spring wood stops are supplied. It is fitted with both front and tail vises, each having $1\frac{1}{2}$ -inch patent saw-cut threaded bench screws. Bench is fitted with both back board and tool rack, as shown in illustration. Weight packed for shipment, 120 pounds. F. O. B. Factory		12.95
14544.	WRENCHES, Monkey, good quality.		
	Length, inches	6 8	
	Each .....	.80 .90	
14546.	WRENCH, Monkey, Pocket. $5\frac{1}{2}$ inches long.....		.18
14548.	WRENCH, Stillson's Pipe. 10 inches long, will take pipe from $\frac{1}{8}$ inch to 1 inch.....		1.80

RAW MATERIAL

The following material has been selected with special reference to the laboratory shop. The prices are based on ordinary quantities and include cost of cutting. Special prices will be quoted on large orders. All prices are subject to market fluctuations. Castings in all metals supplied at market prices.

For TABLES giving Comparative Weights of Metals, see page 528.

ALUMINUM

14800. ALUMINUM ROD, full lengths 8 to 10 feet. (See note below.)

Diam., in.	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Lbs. per ft. ....	.057	.089	.128	.174	.227	.356	.516	.697	.911
Per ft.	\$0.12	.15	.21	.30	.40	.60	.85	1.05	1.35

14802. ALUMINUM SHEET, full sheets 12 inches wide, 5 to 6 feet long. (See note below.)

Thickness, B. & S. No.	8	12	14	16	18	20	22	24	26	28	30
Lbs. per sq. ft.	1.8	1.13	.89	.71	.56	.45	.36	.28	.23	.18	.14
Per sq. ft.	3.00	1.80	1.50	1.20	.90	.75	.60	.50	.45	.35	.30

14804. ALUMINUM TUBING, seamless. Prices on application.

ALUMINUM WIRE, see page 521.

ASBESTOS

ASBESTOS MATERIAL, see Nos. 308 to 326.

BRASS

14830. BRASS ROD, Round, full lengths 12 feet. (See note below.)

Diam., inches..	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/2
Lbs., per ft. ...	.045	.100	.18	.28	.40	.55	.72	1.13	1.63	2.21	2.89	6.51
Per ft. ....	.06	.09	.15	.21	.30	.45	.55	.85	1.20	1.65	2.10	4.75

14832. BRASS ROD, Square, full lengths 10 to 12 feet. (See note below.)

Size, inches	1/4	3/8	1/2	5/8	3/4
Lbs. per ft. ....	.23	.51	.92	1.44	2.07
Per ft. ....	.21	.45	.75	1.15	1.65

14834. BRASS SHEET, full sheets 12 inches wide, about 6 feet long. (See note below.)

Thickness, B. & S. No.	8	10	12	14	16	18	20	22	24	26	28	30
Lbs. per sq. ft.	5.69	4.51	3.57	2.83	2.25	1.78	1.41	1.12	.89	.70	.55	.44
Per sq. ft.	4.95	3.90	3.10	2.50	1.95	1.60	1.25	1.05	.75	.70	.55	.45

14836. BRASS STRIP, full lengths 10 to 12 feet. (See note below.)

Size, inches	1/16x1/2	1/8x1/2	1/8x5/8	3/16x5/8	3/16x1	1/4x1
Lbs. per ft. ....	.115	.23	.29	.435	.69	.92
Per ft. ....	.12	.21	.27	.40	.60	.85

14838. BRASS TUBING, brazed, full lengths 12 feet. (See note below.)

Diam., outside, in.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2	1 3/4	2
Wall	}	No. 14.	Per ft.	...	...	...	...	...	...	...	...	...	...	...
B. & S.		No. 18.	Per ft.	...	...	...	...	...	...	...	...	...	...	...
Gage.		No. 20.	Per ft.	.15	.20	.20	.15	...	...	...	...	...	...	...

BRASS WIRE, 1/16 inch and smaller, see page 521.

CARBON

14840. CARBON, Granulated, for experimental purposes.....Per lb. .25

14842. CARBON RODS, plain, 12 inches long.

Diameter, inches	1/8	3/16	1/4	3/8	1/2	5/8
Each .....	.16	.16	.18	.26	.28	.30

14844. CARBON SHEET, 12x12 inches.

Thickness, inches	1/4	1/2
Per sheet	3.50	4.50

Special sizes, cut to order, quoted on application.

CARBONS, for batteries, see general heading Batteries.

NOTE: For convenience in shipping, certain items—rods, tubing, etc.—are cut in about 3-foot lengths, unless specially ordered in longer pieces.

COPPER

14848. COPPER ROD , full lengths 10 to 12 feet. (See note below.)									
Diam., inches	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
Lbs. per ft.	.047	.106	.189	.426	.757	1.18	1.70	3.03	
Per ft.	\$0.06	.15	.24	.45	.80	1.25	1.80	2.35	
14850. COPPER SHEET , plain, full sheets 12x60 inches. (See note below.)									
Thickness, B. & S. No.	14	16	18	20	22	24	26	28	30
Lbs. per sq. ft.	2.90	2.30	1.83	1.45	1.15	.91	.72	.57	.46
Per sq. ft.	2.85	2.25	1.80	1.50	1.15	.95	.85	.65	.60
14852. COPPER SHEET , Foil B. & S. No. 36.....									Per square foot
									.35
14854. COPPER TUBING , 1/16 inch wall. (See note below.)									
Diameter, outside, inches						1/4	5/8	3/4	1
Per foot						.30	.35	.45	

COPPER WIRE, see page 521.

FERROTYPED

14860. FERROTYPED , plates 10x14 inches.....	Each	.50
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FIBER

14862. FIBER ROD , black, full lengths about 30 inches.									
Diameter, inches	1/4	5/16	3/8	1/2	5/8	3/4	1		
Per foot	.30	.40	.40	.50	.75	1.10	2.45		
14864. FIBER SHEET , black, full sheets about 24x34 inches.									
Thickness, inches	1/8	3/16	1/4	5/16	3/8	1/2			
Per sq. ft.	.95	1.35	1.80	2.45	3.25	4.00			
14866. FIBER TUBING , black, thickness of wall 1/16 inch; full lengths 2 to 3 feet.									
Diameter, inside, inches	1/4	3/8	1/2	5/8	3/4	1			
Per foot	.25	.30	.35	.40	.45	.55			

IRON

14870.	IRON ROD, Norway, soft, for electro-magnets. (See note below.)							
	Diameter, inches	1/4	3/8	1/2	5/8	3/4	1	
	Lbs. per ft.	.16	.37	.67	1.04	1.51	2.68	
	Per ft.	.15	.30	.55	.80	1.15	2.05	
14872.	IRON SHEET, Tinned. Common tin plate, size 20x28 inches.							
	No.			IC	X	XX	XXX	
	Approx. thickness, B. & S. No.			28	26	25	24	
	Per sheet			.55	.60	.65	.70	
14874.	IRON SHEET, American Russia, approximate thickness, 0.016 inch.						Per sq. ft.	.35
	IRON WIRE, see Steel Wire, page 522.							

IRON WIRE, see Steel Wire, page 522.

LEAD

14880. LEAD SHEET .									
Thickness, inches	1/64	1/32	1/16	1/8	3/16	1/4			
Lbs. per sq. ft.	1	2	4	8	12	16			
Per sq. ft.	.50	.60	1.30	2.55	3.85	5.10			
LEAD SHOT, see No. 8216.									
14882. LEAD TUBING , medium wall.									
Diameter, inside, inches	1/4	3/8	1/2	5/8	3/4				
Lbs. per ft.	.375	1.0	1.25	2.0	2.25				
Per ft.	.12	.30	.45	.60	.65				

LEAD WIRE, see page 522.

MICA

14888. MICA SHEET .									
Size, inches	2x4 1/2		4x5	4x6	5x7				
Per sheet	.10		.20	.25	.60				

PHOSPHOR BRONZE

PHOSPHOR BRONZE RIBBON, for galvanometer suspensions, see page 207.

14894. PHOSPHOR BRONZE SHEET , full sheets 6 inches wide and 4 to 6 feet long. (See note below.)									
Thickness, B. & S. No.	22		24	26	30				
Per sq. ft.	2.10		1.75	1.45	1.00				

PLATINUM

PLATINUM SHEET AND WIRE, see general heading Platinum Ware.

NOTE: For convenience in shipping, certain items—rods, tubing, etc.—are cut in about 3-foot lengths, unless specially ordered in longer pieces.

RUBBER

14900. RUBBER ROD , hard, polished, full lengths 30 inches.										
Diam., inches	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Lbs., per ft.	.015	.027	.04	.063	.08	.10	.16	.23	.29	.42
Per ft.	\$0.10	.12	.15	.25	.30	.40	.55	.75	.90	1.35
14902. RUBBER SHEET , hard, polished, full sheets 20x48 inches.										
Thickness, inches			$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	
Lbs. per sq. ft.			.38	.76	1.14	1.52	1.90	2.28	3.04	
Per sq. ft.			1.15	2.40	3.25	4.95	6.00	6.60	9.60	
RUBBER SHEET , soft, see page 429.										
14904. RUBBER TUBING , hard, not polished, $\frac{1}{8}$ inch wall.										
Diameter, outside, inches						$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	
Per ft.						.20	.30	.40	.50	
RUBBER TUBING , soft, see general heading Rubber Tubing.										

STEEL

STEEL WIRE, see page 522.

STEEL RIBBON, for galvanometer suspensions, see page 207.

14906. STEEL ROD , Cold Rolled, Rectangular, full lengths 10 to 12 feet. (See note below.)										
Size, inches	$\frac{1}{16} \times \frac{1}{2}$	$\frac{1}{8} \times \frac{1}{2}$	$\frac{1}{4} \times 1$	$\frac{1}{2} \times \frac{3}{4}$	$\frac{3}{4} \times 1$					
Lbs. per ft.	.106	.212	.85	1.28	2.55					
Per ft.	.10	.15	.35	.40	.75					
14907. STEEL ROD , Cold Rolled, Round, full lengths 10 to 12 feet. (See note below.)										
Diameter, inches	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1		
Lbs. per ft.	.17	.27	.39	.67	1.1	1.5	2.1	2.7		
Per ft.	.10	.10	.12	.15	.25	.30	.40	.55		
14908. STEEL ROD , Cold Rolled, Square, full lengths 10 to 12 feet. (See note below.)										
Size, inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1					
Lbs. per ft.	.213	.478	.851	1.94	3.4					
Per ft.	.12	.15	.25	.55	.85					
14910. STEEL ROD , Coppered Bessemer, round, full lengths 4 feet. (See note below.)										
Diameter, inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$			
Lbs. per ft.	.05	.10	.17	.27	.39	.52	.67			
Per ft.	.05	.05	.05	.10	.10	.15	.20			
14912. STEEL ROD , Drill Rod, round, for tool making.										
Diam., inches	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Per foot	.15	.20	.25	.30	.40	.50	.65	.75	.90	1.00
14914. STEEL ROD , Magnet, Round.										
Diameter, inches						$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Per foot						.15	.35	.60	.95	1.35
14915. STEEL ROD , Magnet, Square.										
Size, inches						$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Per foot						.20	.45	.80	1.20	1.70
Hardening and magnetizing quoted upon application.										

TIN

TIN SHEET, see Iron Sheet, tinned.

14930. TIN SHEET , pure block tin, B. & S. No. 22, 12 inches wide.										
									Per sq. ft.	3.10
14932. TIN TUBING , Pure block tin.										
Diameter, inside, inches	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$				
Ounces per foot	4	5	6	8	8	12				
Per ft.	.75	.90	1.05	1.45	1.45	2.10				

ZINC

14940. ZINC SHEET , thin, B. & S. No. 32.									Per sq. ft.	.20
14942. ZINC SHEET .										
Thickness, inches	$\frac{1}{32}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$				
Lbs. per sq. ft.	1.15	2.30	4.60	6.90	9.20	11.50				
Per sq. ft.	.75	1.35	2.80	4.00	5.35	6.65				

ZINC WIRE, see page 523.

NOTE: For convenience in shipping, certain items—rods, tubing, etc.—are cut in about 3-foot lengths, unless specially ordered in longer pieces.

APPROXIMATE FEET PER POUND OF WIRE.

Also Approximate Resistance of Copper and German Silver Wire.

For sizes larger than No. 14, see table of weight of rods on page 528.

B. & S. No.	Aluminum Wire.	Brass or G. S. Wire.	Copper Wire.			Iron or Steel Wire.	Ohms per foot.	
			Bare.	D. C. C.	D. S. C.		Copper.	18% G. S.
14	268	85	80	.....	.....	88	.00252	.0460
15	334	107	102	.....	.....	108	.00318	.0580
16	417	132	128	.....	.....	139	.00401	.0732
17	526	171	162	.....	.....	178	.00506	.0923
18	667	215	204	.....	.....	226	.00637	.1164
19	847	272	264	.....	.....	279	.00804	.1467
20	1,063	343	324	298	312	353	.01014	.1850
21	1,346	431	408	370	389	446	.01278	.2333
22	1,695	549	515	461	493	565	.01612	.2941
23	2,123	684	650	584	631	714	.02032	.3710
24	2,680	869	819	745	779	909	.02563	.4678
25	3,389	1,086	1,033	903	966	1,124	.03231	.5899
26	4,291	1,388	1,302	1,118	1,202	1,428	.04075	.7438
27	5,405	1,754	1,642	1,422	1,542	2,000	.05138	.9386
28	6,849	2,222	2,071	1,759	1,917	2,273	.06479	1.183
29	8,620	2,777	2,611	2,207	2,485	2,857	.08170	1.491
30	10,869	3,448	3,294	2,534	2,909	3,623	.1030	1.879
31	.....	4,347	4,152	2,768	3,683	4,566	.1299	2.371
32	.....	5,555	5,236	3,737	4,654	5,649	.1638	2.990
33	.....	7,142	6,602	4,697	5,689	7,194	.2066	3.771
34	.....	9,090	8,328	6,168	7,111	9,090	.2605	4.756
35	.....	11,111	10,501	6,737	8,534	11,493	.3284	5.997
36	.....	14,084	13,258	7,877	10,039	14,493	.4142	7.560
37	.....	.....	16,691	9,309	10,666	.....	.5222	9.532
38	.....	.....	20,854	10,666	14,222	.....	.6585	12.02
39	.....	.....	26,302	11,907	16,516	.....	.8304	15.16
40	.....	.....	33,176	14,222	21,333	.....	1.047	19.11

WIRE GAGE TABLE.

Showing sizes in decimal parts of an inch.

Wire Gage Number.	American or Brown & Sharpe.	Washburn & Moen Mfg. Co.	Music Wire.	Wire Gage Number.	American or Brown & Sharpe.	Washburn & Moen Mfg. Co.	Music Wire.
00	.365	.331	.0087	18	.0403	.047	.040
0	.325	.307	.0093	19	.0359	.041	.042
1	.289	.283	.0098	20	.0320	.035	.043
2	.258	.263	.0105	21	.0285	.032	.045
3	.229	.244	.0115	22	.0253	.028	.047
4	.204	.225	.0125	23	.0226	.025	.049
5	.182	.207	.0145	24	.0201	.023	.053
6	.162	.192	.0150	25	.0179	.020	.056
7	.144	.177	.0175	26	.0159	.018	.061
8	.128	.162	.0190	27	.0142	.017	.064
9	.114	.148	.0220	28	.0126	.016	.069
10	.102	.135	.0245	29	.0113	.015	.072
11	.091	.120	.0270	30	.0100	.014	.076
12	.081	.105	.0285	31	.0089	.0135	.081
13	.072	.092	.0305	32	.0080	.013	.086
14	.064	.080	.0320	34	.0063	.010	.101
15	.057	.072	.0350	36	.0050	.009	.118
16	.051	.063	.0360	38	.0040	.008	.130
17	.045	.054	.0380	40	.0031	.007	.175

Fractional Equivalents in Decimals.

Fractional parts of an inch.....	$\frac{1}{2}$	$\frac{7}{16}$	$\frac{3}{8}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{64}$
Decimal parts of an inch.....	.5	.438	.375	.313	.25	.188	.125	.063	.031	.016

APPROXIMATE WEIGHT IN POUNDS OF RODS ONE FOOT LONG.

Diameter.	Aluminum.	Brass.	Copper	Iron or Steel.
$\frac{1}{16}$	.0034	.011	.012	.010
$\frac{1}{8}$	.0144	.045	.048	.041
$\frac{3}{16}$	.032	.100	.106	.092
$\frac{1}{4}$	.057	.175	.190	.166
$\frac{5}{16}$	.089	.275	.296	.260
$\frac{3}{8}$	.128	.395	.426	.372
$\frac{7}{16}$	.174	.540	.579	.508
$\frac{1}{2}$	.227	.710	.757	.664
$\frac{9}{16}$	.288	.900	.958	.842
$\frac{5}{8}$	.356	1.100	1.182	1.034
$\frac{3}{4}$	.511	1.66	1.703	1.501
$\frac{7}{8}$	.696	2.15	2.318	2.014
1	.910	2.85	3.03	2.660

APPROXIMATE WEIGHT IN POUNDS OF ALUMINUM, BRASS, COPPER, IRON, STEEL AND ZINC PER SQUARE FOOT.

B. & S. No.	Size, Inches.	Nearest fraction.	Aluminum.	Brass.	Copper.	Iron or Steel.	Zinc.
1	.2893	..	4.029	12.382	13.105	10.993	10.746
2	.2576	$\frac{1}{4}$	3.588	11.027	11.671	9.790	9.337
3	.2294	$\frac{7}{32}$	3.195	9.819	10.393	8.718	8.522
4	.2043	..	2.845	8.744	9.255	7.763	7.589
5	.1819	$\frac{3}{16}$	2.534	7.787	8.242	6.914	6.658
6	.1620	$\frac{5}{32}$	2.256	6.934	7.339	6.157	6.018
7	.1443	..	2.009	6.175	6.536	5.482	5.354
8	.1285	$\frac{1}{8}$	1.789	5.499	5.821	4.882	4.773
9	.1144	..	1.594	4.898	5.184	4.348	4.251
10	.1019	..	1.418	4.361	4.615	3.871	3.756
11	.0907	$\frac{3}{32}$	1.264	3.884	4.110	3.448	3.37
12	.0808	..	1.126	3.458	3.661	3.071	3.00
13	.0719	..	1.002	3.080	3.260	2.734	2.62
14	.0641	$\frac{1}{16}$	.892	2.743	2.903	2.435	2.32
15	.0571	..	.795	2.442	2.585	2.168	2.06
16	.0508	..	.708	2.175	2.302	1.931	1.87
17	.0452	$\frac{3}{64}$	.630	1.937	2.050	1.720	1.68
18	.0403	..	.561	1.725	1.826	1.531	1.50
19	.0359	..	.500	1.536	1.626	1.364	1.35
20	.0319	$\frac{1}{32}$	.435	1.368	1.448	1.214	1.20
21	.0284	..	.396	1.218	1.289	1.081	1.05
22	.0253	..	.353	1.085	1.148	.963	.95
23	.0226	..	.314	.966	1.022	.858	.85
24	.0201	..	.280	.860	.910	.764	.75
25	.0179	..	.249	.766	.811	.716	.67
26	.0159	$\frac{1}{64}$	.222	.682	.722	.636	.60
27	.0142	..	.197	.607	.643	.568	.52
28	.0126	..	.176	.541	.573	.504	.45
29	.0112	..	.157	.482	.510	.452	.40
30	.0100	..	.140	.429	.454	.400	.37

COMPARATIVE RESISTANCES OF METALS.
(Copper as the Unit.)

Aluminum (99% pure).....	1.61	Nickel	7.78
Copper	1.00	Platinum (annealed)	5.65
German Silver (18% Nickel).....	18.00	Platinoid	20.00
Gold (99.9% pure).....	1.38	Silver (annealed)92
Iron	5.70	Tin	8.28
Lead	12.80	Zinc	3.62

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